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THE SIEGE OF THE SOUTH POLE

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The Ramparts of the South Pole.

(Photograph supplied by Professor E. von Drygalski.)

THE SIEGE OF *the* SOUTH POLE

By HUGH R. ^{Robert}MILL, D.Sc., LL.D.

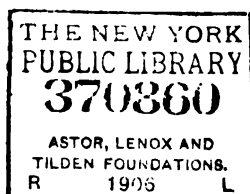
With ILLUSTRATIONS *from* Drawings, Photographs, and Maps, and with MAP IN COLOURS *by* J. G. BARTHOLOMEW



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Published in October, 1905

TO
MY MOTHER
WHOSE LOVE OF NATURE LED ME TO SCIENTIFIC STUDY
AND TO
MY WIFE
FOR HER UNFAILING HELP



PREFACE

THIS book has been the burden of the holidays of three years—in Switzerland, in Scotland, and in the United States—and it expresses the result of the reading of thirty. Though I have never been within two thousand miles of the Antarctic Circle it has been my good fortune to possess the personal friendship of all, or almost all, the living explorers and promoters of exploration in the Antarctic Regions, and I have been privileged to speed the parting ships of every Antarctic expedition which left a British port, from the sailing of the Dundee fleet in 1892 to that of the *Terra Nova*, in 1903, though to my regret on each occasion I shared the unhappy fate of the stowaways, and was landed before my native shores were left behind, or at the farthest before the tropics were reached.

I have based this history of Antarctic exploration as far as possible on original narratives and on the conversation of the men who themselves took part in it. In this respect I owe a special debt to three: to **SIR JOSEPH HOOKER**, the last survivor of the *Erebus*, who, in addition to much other kindness, has read the proofs of the earlier chapters, including those dealing with Sir James Clark Ross's expedition; to **SIR JOHN MURRAY**, of the *Challenger*, whose friendship and scientific guidance for more than twenty years have been the most effective parts of my education; and to His Excellency **PROFESSOR GEORG VON NEUMAYER**, the charm of whose personality and the

enthusiasm of his devotion to South Polar problems have been a continual inspiration.

In trying to elucidate the origin as well as to describe the events of the various expeditions, I have assumed that from the historical point of view the motive and the aim are as important as the resulting achievement or failure. The story is told to the best of my power with an impartial mind, and scrupulously follows the facts; if any error has been made as to the narrative it is a mistake and not due to any bias. Where an opinion is expressed that opinion is my own, and though I consider it right it may possibly seem wrong to some.

The two introductory chapters dealing with voyages which fell short of the Antarctic Circle are designedly brief and uncritical. In them I have stated the views of those whom I consider to be the best authorities. The descriptions of exploration from the voyage of the *Resolution* to that of the *Challenger* are more detailed because, except for Cook's voyage, the narratives drawn upon are almost all out of print and difficult to consult. The later voyages are touched on lightly, for each is described in one or several authoritative narratives recently published, and to be found everywhere. The names of these works are given in the Appendix.

In selecting and arranging for the illustrations I have been greatly helped by the Editor of this series, my old colleague, DR. J. SCOTT KELTIE. The unique picture of Admiral Bellingshausen was secured by the kind representations made to the Head of the Russian Admiralty by my friend COLONEL J. DE SHOKALSKY of St. Petersburg. CAPTAIN R. F. SCOTT of the *Discovery*, PROFESSOR E. VON DRYGALSKI of the *Gauss*, DR. OTTO NORDENSKJÖLD of the *Antarctic*, M. ARCTOWSKI of the *Belgica*,

PREFACE

ix

and MR. W. S. BRUCE, of the Scotia, have generously allowed photographs taken by them to be reproduced. CAPTAIN SCOTT and MR. BRUCE have also been kind enough to read the proofs of the portions of Chapter XX dealing with their expeditions. There are many others to whom I am grateful for help, especially my friends MR. E. HEAWOOD, Librarian of the Royal Geographical Society, whose patience I have too frequently called into lively exercise, and MR. J. G. BARTHOLOMEW for his coöperation in the preparation of the maps; to CAPTAIN A. MOSTYN FIELD, the Hydrographer to the Admiralty, who kindly aided me in settling several historical points, and to MR. P. L. DAVIS, of the Nautical Almanac Office, for a copy of the valuable letter written by his father, the late Captain Davis, R. N., when on the Terror.

This book does not profess or attempt to describe the Antarctic Regions or their peculiar conditions; it is merely the record of an uncompleted episode in the history of geographical exploration.

H. R. M.

62 Camden Square,
LONDON, N. W.,
15th July, 1905.

CONTENTS

PREFACE	vii
I THE ORIGIN OF THE IDEA	I
II THE INTELLECTUAL SLEEP AND THE AWAKENING . .	10
III SEARCHING FOR THE SOUTH LAND	28
IV THE ACHIEVEMENT OF JAMES COOK	56
V AMERICAN SEALERS IN THE SOUTH	91
VI BELLINGSHAUSEN'S ANTARCTIC VOYAGE	114
VII WEDDELL'S FARTHEST	131
VIII ENDERBY BROTHERS AND THE ANTARCTIC . . .	146
IX THE DAWN OF THE VICTORIAN ERA	174
X DUMONT D'URVILLE AND THE FRENCH DASHES TOWARD THE SOUTH POLE	193
XI CHARLES WILKES AND THE UNITED STATES EX- PLORING EXPEDITION	211
XII JAMES CLARK ROSS	249
XIII THE DISCOVERY OF VICTORIA LAND	262
XIV HAIRBREADTH ESCAPES IN THE ICE	289
XV THE LAST ANTARCTIC VOYAGE OF THE EREBUS AND TERROR	314
XVI THE GENERATION OF AVERTED INTEREST	327
XVII THE CHALLENGER	344
XVIII STEAM WHALERS BOUND SOUTH	362
XIX THE FIRST ANTARCTIC NIGHT	383
XX EARLY EXPEDITIONS OF THE TWENTIETH CENTURY	406
XXI THE RAISING OF THE SIEGE	433
APPENDIX: The Principal Antarctic Voyages Chronologically Arranged, with References to the Literature of the Subject	443
INDEX	451

ILLUSTRATIONS

The South Polar Regions. Coloured Map by J. G. Bartholomew	<i>End of Volume</i>
The Ramparts of the South Pole. (Photograph supplied by Professor E. von Drygalski.)	<i>Frontispiece</i>
The World According to Homer	<i>Page 2</i>
The World According to Herodotus	<i>Facing p. 4</i>
The Habitable World and the Globe According to Strabo and Pomponius Mela	" 6
The World According to Ptolemy	" 8
The Theory of Impassable Zones	<i>Page 8</i>
Diagram of Spherical Earth, with no Antipodes. (After Rainaud.)	" 12
The Earth, According to Cosmas Indicopleustes	" 13
Wheel-Map of the Twelfth Century. (From Nor- denskiöld's <i>Facsimile Atlas</i> .)	" 14
The Map of Macrobius	" 16
The Sea Route to India on an Early Map. (From Nordenskiöld's <i>Facsimile Atlas</i> .)	" 19
The Continuous Southern Ocean. (From Norden- skiöld's <i>Facsimile Atlas</i> .)	<i>Facing p. 24</i>
The Map of Orontius, Southern Hemisphere. (From Nordenskiöld's <i>Facsimile Atlas</i> .)	" 26
Typical Antarctic Iceberg. (Photograph supplied by Professor E. von Drygalski.)	" 46
Dalrymple's Chart of the South Pacific, 1764	" 50
Alexander Dalrymple	" 58
Captain James Cook	" 64
Cook's Tracks near Bouvet Island	<i>Page 70</i>
The Ice Islands of the Antarctic (From Cook's "Second Voyage.")	<i>Facing p. 72</i>
Royal Bay, Isle of Georgia. (From Cook's "Second Voyage.")	" 80
Cook's Chart of the Isle of Georgia	<i>Page 80</i>
Elephant Island, one of the South Shetlands. (From D'Urville's <i>Atlas</i> .)	<i>Facing p. 94</i>

Powell's Chart of the South Shetlands . . .	<i>Facing p.</i>	98
The Meeting of Palmer and Bellingshausen. (From Fanning's "Voyages Round the World.")	"	100
Benjamin Morrell, Jr.	"	106
Admiral Bellingshausen. (From a Portrait in the Library of the Imperial Naval Department in St. Petersburg.)	"	116
The Vostok and Mirni off Macquarie Island. (From Bellingshausen's <i>Atlas</i> .)	"	124
Peter I. Island and Alexander I. Land. (From Bellingshausen's <i>Atlas</i> .)	"	128
James Weddell. (From a Painting in the Library of the Royal Geographical Society.)	"	132
Weddell's Seal, <i>Leptonychotes Weddelli</i> . (1) From Weddell's "Voyage Towards the South Pole." (2) From the "British Museum Re- ports on the Southern Cross Collections" .	"	134
The Jane and Beaufoy at Weddell's Farthest. (From Weddell's "Voyage Towards the South Pole.")	"	138
The Balleny Islands (From a Sketch by John McNab.)	"	170
General Sir Edward Sabine, K. C. B. (From a Painting in the Rooms of the Royal Society.)	"	180
Baron von Humboldt	"	184
Synoptic Diagram of the Early Victorian Expedi- tions	"	192
Admiral Dumont D'Urville. (From D'Urville's <i>Atlas</i> .)	"	194
The Astrolabe and Zelée in the Ice. (From D'Urville's <i>Atlas</i> .)	"	200
D'Urville's Expedition Amongst the Ice Islands. (From D'Urville's <i>Atlas</i> .)	"	202
Hoisting the French Flag on Adélie Land. (From D'Urville's <i>Atlas</i> .)	"	206
Lieutenant Charles Wilkes, U. S. N., Command- ing the United States Exploring Expedition. (From the Narrative of the Expedition.)	"	214
Ringgold's Knoll. (From the Narrative of the U. S. Exploring Expedition.)	<i>Page</i>	228

ILLUSTRATIONS

xv

Peacock Bay in the Ice Barrier	Page 232
The Peacock in Peril. (From the Narrative of the U. S. Exploring Expedition.)	Facing p. 232
View of the Antarctic Continent from an Ice Island on February 14, 1840. (From the Nar- rative of the U. S. Exploring Expedition.)	" 240
Facsimile of Part of the Chart Given by Wilkes to Ross, with the Tracks of the Erebus and Terror, and of the Discovery, added . . .	" 246
Sir James Clark Ross. (From a Water-colour in the Possession of the Royal Geographical Society.)	" 250
Sir Joseph Dalton Hooker, G. C. S. I. (From a Pen and Ink Sketch by T. B. Wirgmann.) .	" 254.
Iceberg in Ross Sea. (Photograph taken by the National Antarctic Expedition on Board the Discovery.)	" 270
Admiralty Range. (Photograph taken by the Na- tional Antarctic Expedition.)	" 274
Possession Island. (From Ross's "Voyage to the Southern Seas.")	" 276
Penguin Hunting. (From Ross's "Voyage to the Southern Seas.")	" 276
View of the Great Southern Barrier. (From Ross's "Voyage to the Southern Seas.") .	" 280
Ross's Chart of the Great Southern Barrier with the Track of the Discovery Added	" 284
The Erebus and Terror in a Gale in the Pack. (From Ross's "Voyage to the Southern Seas.")	" 296
The Erebus and Terror in Collision. (From Ross's "Voyage to the Southern Seas.") .	" 310
Davis's Diagram of the Collision between the Erebus and Terror	Page 311
His Excellency Geheimrath Professor Georg von Neumayer	Facing p. 338
Sir John Murray, K. C. B., of the Challenger. (Photograph by Messrs. Thomson, London.)	" 348
The Miller-Casella Deep-Sea Thermometer	Page 354
Outer Case of Miller-Casella Deep-Sea Ther- mometer	" 355

H. M. S. Challenger after Collision with an Iceberg. (From the Challenger Narrative.)	<i>Facing p.</i>	358
Lieutenant A. de Gerlache	"	384
Typical Landscape of the Palmer Archipelago. (Photograph by the Belgian Antarctic Expedition.)	"	388
Carstens Egeberg Borchgrevink. (Photograph by Messrs. Thomson, London.)	"	394
Synoptic Diagram of the First Two Expeditions Wintering in the Antarctic	<i>Page</i>	397
Penguins, near Cape Crozier. (Photograph supplied by Captain Scott.)	<i>Facing p.</i>	400
Bouvet Island. (Photograph Taken on Board the Valdivia.)	"	404
Sir Clements R. Markham, K. C. B. (Photograph by Messrs. Thomson, London.)	"	406
Captain R. F. Scott, R. N., C. V. O. (Photograph by Messrs. Thomson, London.)	"	408
The Discovery Alongside the Barrier. (Photograph supplied by Captain Scott.)	"	412
McMurdo Strait. (From a Photograph taken by the National Antarctic Expedition.)	"	416
Professor Erich von Drygalski. (Photograph by Messrs. Thomson, London.)	"	418
The Gauss under Sail. (Photograph supplied by Professor E. von Drygalski.)	"	420
The Gaussberg, Kaiser Wilhelm II. Land. (Photograph supplied by Professor E. von Drygalski.)	"	422
Dr. Otto Nordenskjöld	"	424
The Antarctic in Cumberland Bay, South Georgia. (Photograph supplied by Dr. Otto Nordenskjöld.)	"	426
William S. Bruce. (Photograph by Messrs. Thomson, London.)	"	428
The Scotia in the Pack. (Photograph supplied by the Scottish Antarctic Expedition.)	"	430
Synoptic Diagram of the First Antarctic Expeditions of the Twentieth Century	<i>Page</i>	430

Siege of the South Pole

CHAPTER I

THE ORIGIN OF THE IDEA

"A wanderer is Man from his birth.

He was born in a ship on the breast of the river of Time
Brimming with wonder and joy . . ."

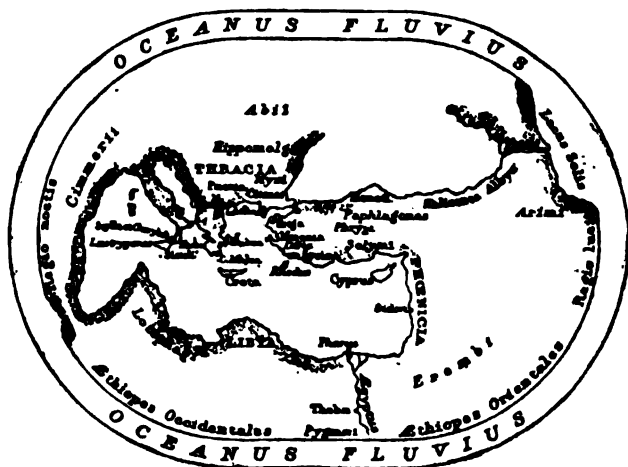
—MATTHEW ARNOLD.

VOYAGES towards the South Pole commenced so long ago, and they have exercised an influence on the trend of exploration so continuously, that a complete history of the search for the Antarctic would almost be a history of geographical discovery.

The particular motive to Antarctic exploration has varied from age to age as the special problem it was expected to solve has changed with the growth of knowledge and the development of thought. When first stated the problem was no more than a philosophical speculation, a mere academic thesis interesting a few learned men. It grew to be a burning question in the struggle of rival Powers for commercial and political supremacy. It was a force in empire-building, with the Commonwealth of Australia as a product of its partial solution. The period of stress and strife has passed with the strenuous lives of the circumnavigators; but a time of renewed interest of a quieter sort has come when it is particularly appropriate to turn a backward glance toward the beginning.

2 SIEGE OF THE SOUTH POLE

The Antarctic problem has now crystallised into an object of scientific research, the results of which may indeed become practically useful, but in a manner too uncertain and remote to be a leading motive. Its solution has been reduced to the result of exploration in the ice, and the final result will round out the knowledge of the globe into completeness and will leave no spot of



THE WORLD ACCORDING TO HOMER. B.C. 1000.

Earth unknown. When the story of the Antarctic can be fully told *Terra Incognita* will cumber the map no more.

At the dawn of geographical history an antarctic problem was impossible because the Earth was viewed as a flat disc girdled by the Ocean River and bounded by darkness. Curiously enough the name became possible before the idea. When the early Greek students of the stars, looking out hour after hour and night after night on the wheeling vault overhead, classified the brightest

points into groups or constellations they named the most conspicuous of these which never set *Arctos*—the Bear—and the point round which it, in common with the rest of the heavenly host, appeared to turn was called the Arctic pole. The natural antithesis of an antarctic pole of the heavens, that is, a fixed point *opposite the arctic*, must have occurred to many minds, for it was easy in imagination to complete the sphere of the celestial vault, traced out in part by the unseen portion of the circuit of the stars, but the flat cake of the habitable world stretched between, separating the domain of light and possible knowledge from that of darkness and the unknowable. The dark and gloomy space under the Earth traversed only by the souls of the dead on their way to Hades, was known as *Erebus*, a place of terror, used ages later by Shakespeare as a fit metaphor for the man that had no music in his soul.

We cannot attempt here to discuss all the modern views as to the growth and decay of the ancient theories to which we must refer, but from the immense literature which has flourished upon the resulting soil we will attempt to show how the mind of all ages has exercised itself upon this particular problem. The narrative is not critically exact, for it claims only to afford a basis on which the efforts of modern explorers may be seen in their relation to the gradual unfolding of human knowledge regarding the Earth.

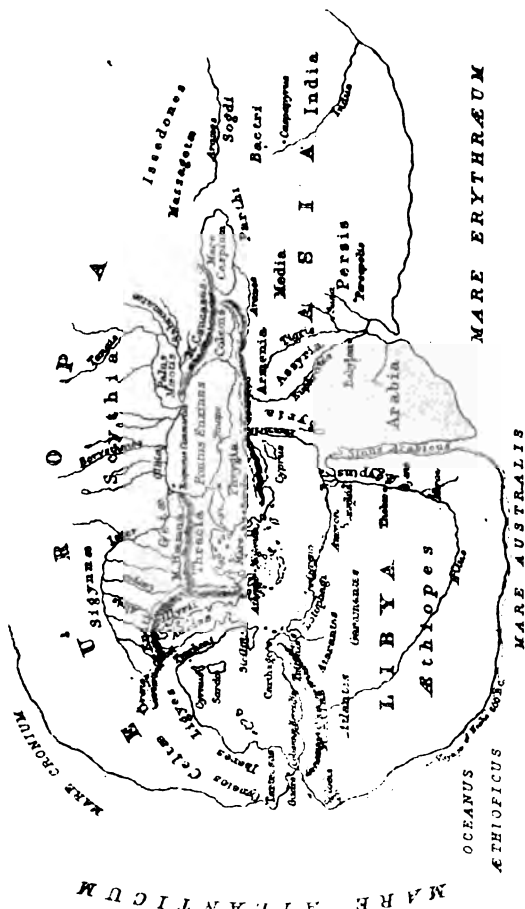
Herodotus made merry over the absurdity of the round disc of the habitable Earth put forth in the descriptions of Hecataeus. As a traveller and a lover of truth he knew that travellers had been able to get farther from west to east than from north to south about the Mediterranean as a centre, and he was content with this knowledge.

4 SIEGE OF THE SOUTH POLE

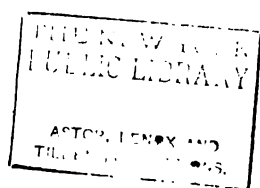
The speculations of the Pythagorean philosophers were not restrained by trammels of fact or experience, and relying on general principles they contemplated the probability of the Earth being a sphere because the sphere was the most perfect form, and the abode of Man the perfection of creation ought also to be perfect of its kind. In this conception of ideal perfection and symmetry we find the first principle of geographical theory; Herodotus himself had made large use of it in tracing out the course of the rivers of Africa by comparison with those of Europe. If the Earth were spherical the long narrow belt of the Habitable World could occupy only a small portion of its surface. Was the Ocean River to be extended into a huge continuous sheet enveloping all the rest? The idea was contrary to Greek reason. Symmetry demanded other worlds breaking up the dreary voids of ocean on which the mind could not otherwise dwell in comfort. If the new form of the Earth could be entertained by reasonable people there was no reason why there should not be another Habitable World under the Antarctic pole of the heavens to balance that which lay under the Arctic pole. So with the possibility of a spherical Earth the Antarctic problem had its birth.

It is a far cry from a poetical fancy to an established fact. Many minds could entertain the fancy, however novel it might be, but only one or two in all the ages of human history could test the fancy as to whether it was fact or not. Aristotle, the intellectual giant who founded so much of modern science, demonstrated the truth of the spherical form of the Earth and some of his proofs enunciated three and a half centuries before the beginning of our era still hold their place in the school-books of to-day. According to Aristotle the Earth was a sphere

THE WORLD
according to
HERODOTUS
BC 450



The World according to Herodotus.



THE ORIGIN OF THE IDEA 5

because of the tendency of matter to fall together to a common centre, and it was proved to be a sphere by the fact that no other form could always throw a circular shadow on the moon during an eclipse, and because on no other form of Earth could the shifting of the horizon be explained as one travelled from north to south and saw the old familiar stars drop out of sight, while new constellations rose into view.

This stupendous discovery of the true form of the Earth brought in its train others of equal magnitude. A spherical Earth in the centre of a spherical heaven studded with constellations of invariable form was no longer an unknown trackless waste. The stars were landmarks everywhere, for by noting the height of the celestial pole above the horizon the traveller could tell how far he was north or south of the middle line or equator which could be imagined as dividing the globe into halves. And it followed that a distance on the surface that corresponded to an increase or decrease of the elevation of the celestial pole by one degree must be exactly one three-hundred-and-sixtieth of the whole circumference of the Earth. It would suffice then to measure the length in miles or yards of that distance and multiply by 360 to know the size of the globe and so to calculate the exact dimensions and position of the Habitable World surrounding the Mediterranean and the distance it would be necessary to sail over the ocean to come from its west coast to its east or from its north coast to its south. All this was clear to the minds of Aristotle and his followers, but there were innumerable difficulties to be overcome before the established theory could be applied to elicit new facts. Though latitude could easily be reckoned from the altitude of the pole by night, or that of the sun

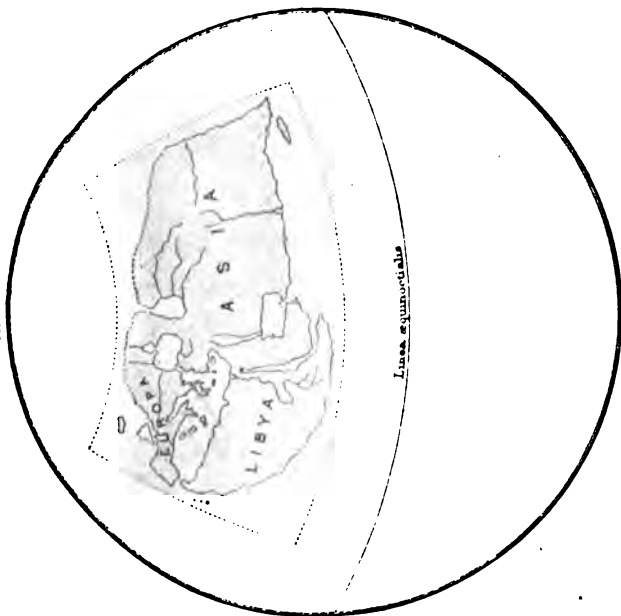
6 SIEGE OF THE SOUTH POLE

at noon, there was no such easy method of finding longitude, because there was no time-keeper by which a traveller could carry with him the time of an initial meridian. The instruments for finding latitude were also clumsy in the extreme, and the method most in use for centuries was that of noting the length of the longest day. It was difficult, for these reasons, to lay out a line due north and south, the ends of which could be fixed with any precision in order to measure the size of the Earth; hence it is amazing how very near the estimate of such a mathematician as Eratosthenes came to the truth.

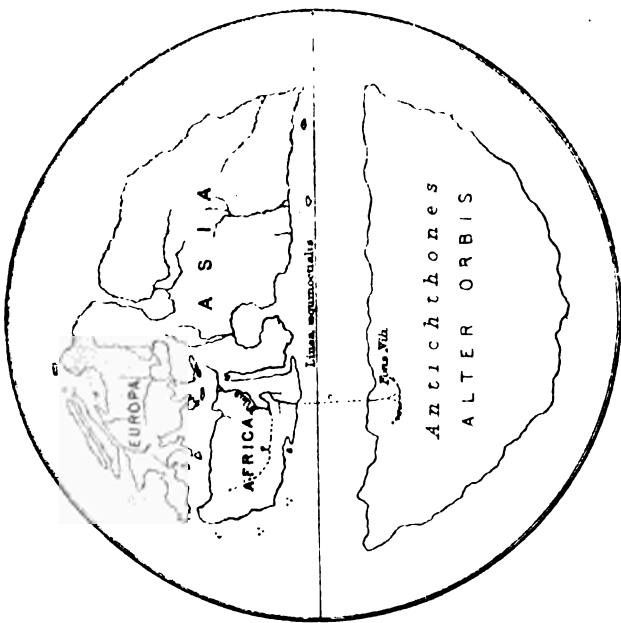
When the shape and size of the Earth became known the main problem of geography was completely altered; it was no longer the question of the possibility of an antarctic region existing; but the possibility of reaching it. The problem, in fact, was the wider one of the distribution of land and water, of climate and the means of travelling, the antarctic problem of to-day being but the unsolved residue of the larger problem.

The estimates of Eratosthenes (about 250 B. C.) made it apparent that the Habitable World of the Greeks occupied only about one-quarter of the surface of the sphere. It seems a limited World to us, though vast enough to those whose swiftest means of transport were the horse and the galley. Controversy was active amongst the Greek philosophers as to the plan of the Earth. The Stoics upheld the continuity of the ocean and viewed the Habitable World as one out of four large islands placed symmetrically upon the sphere, one to balance the other. Nature loved life, so those three unknown Worlds were also inhabited and it was easy to fit the hypothetical peoples with appropriate and expressive names according to their position with regard to the Old World, the Antöken,

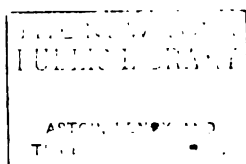
THE WORLD
according to
STRABO
AD 18



THE WORLD
according to
MELA
AD 43



The Habitable World and the Globe according to Strabo and Pomporinus Mela.



THE ORIGIN OF THE IDEA 7

Periöken and Antipodes. Strabo and Pomponius Mela at a much later date gave expression to this view.

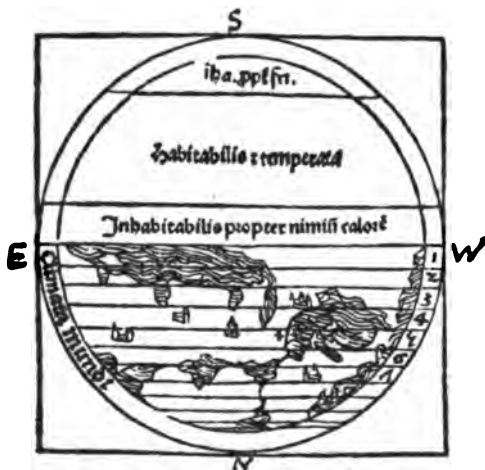
But the rival philosophers following the lead of Hipparchus ridiculed a theory founded on no better basis than the principle of symmetry, and relying on a statement of the Chaldean astronomer, Seleukos, that the Indian ocean was tideless (a statement entirely contrary to fact) argued that the land was really continuous and the seas occupied enclosed basins within it, of which the Caspian was one of the smallest. How this idea of Seleukos outweighed the historical circumstance mentioned by Herodotus that a Phoenician expedition had circumnavigated Africa by the south we cannot tell. The fact remains that the Alexandrian School took up the theory of continuous land and that Ptolemy, the greatest teacher of that School, and the ultimate repository of the Geography of the Greeks, embodied it in his celebrated map. Thus it happened that his error changed the direction and retarded the progress of geographical discovery for twelve hundred years after his death.

Anyone who reads the laborious arguments by which the ancient philosophers buttressed their fancies as to other habitable worlds and their people must be struck by the vast amount of admirable controversy which might have been rendered unnecessary by a few expeditions carried out with the determination which characterised the Greek wars. One reason of this apparent lack of enterprise was undoubtedly the general acceptance of the existence of zones of climates, which was an important truth but poisoned by the exaggerated intensity of the climates attributed to the extreme zones.

Without going fully into the question of the zones it is enough to say that even when the flat-Earth theory pre-

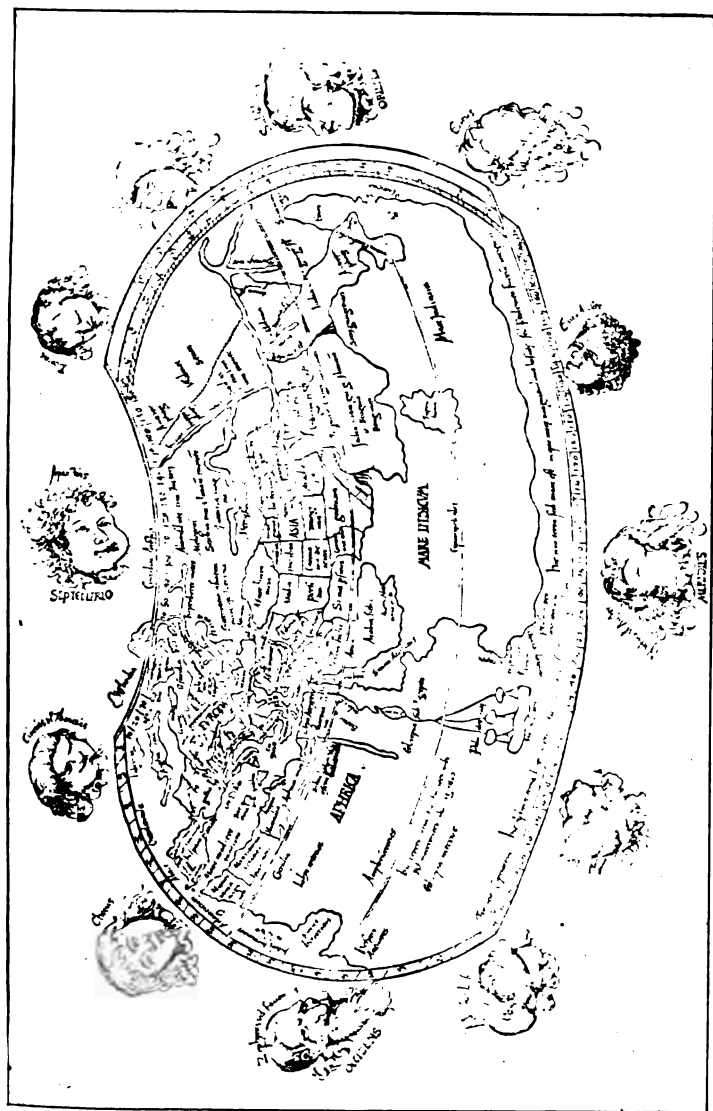
8 SIEGE OF THE SOUTH POLE

vailed it was recognised that far to the north of the pleasant temperate zone, which included the Mediterranean lands, there was a frigid zone of frightful cold, and to the south a torrid zone of frightful heat. The acceptance of the spherical theory of the Earth involved the duplication of these zones in the southern hemisphere



THE THEORY OF IMPASSABLE ZONES.

and their continuation as unbroken rings round the globe. It was very generally held that the frigid zones were unfit for habitation on account of the cold, and the torrid zone on account of the heat, while the temperate zones alone were habitable. Hence the Habitable World of the north temperate zone was separated from the Antichthone or habitable world of the south temperate zone by the burning torrid belt, in which, as the equator was approached the heat and dryness of the Sahara grew worse and worse, until all life became impossible. The two habitable worlds were believed to be separated by an impassable



The World according to Ptolemy.

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THE ORIGIN OF THE IDEA 9

ble gulf of unendurable heat; the sea was alive with whales of incredible size, and monsters defying description; it was thick with floating weed through which a ship could not make way, and notwithstanding the intensity of the solar heat by day and the fire thrown down by the stars at night, it was veiled in a perpetual stifling fog. All these exaggerations have so clear a basis of truth that we can hardly acquit the Phoenician sailormen, who traded far into the tropics, of wilfully heightening the discomforts of the doldrums, the terrors of equatorial thunder-storms and of the dust clouds blown from the Sahara, in order to maintain their monopoly.

Whether the southern hemisphere were held to consist mainly of land or of water the terrors of the torrid zone supply a sufficient explanation of the failure of the early explorers to penetrate it. At the same time there is evidence that before the growth of the torrid myth some voyages to the south had been undertaken with success. It may be that Ophir was in the southern hemisphere; it is practically certain that Africa was circumnavigated by the Phoenicians and that other early travellers had sailed far southward along the east coast of that continent. But these achievements were forgotten, and the legacy of Greek wisdom to Christendom was the fact that the Earth is a globe and the belief that the southern hemisphere of that globe contained habitable land which could never be reached.

CHAPTER II

THE INTELLECTUAL SLEEP AND THE AWAKENING

"Let things be—not seem.
I council rather,—do, and nowise dream!
Earth's young significance is all to learn:
The dead Greek lore lies buried in the urn
Where who seeks fire finds ashes."

—ROBERT BROWNING.

OTHER interests filled the troubled Middle Ages, the Greek language with the works of Aristotle and Ptolemy were almost forgotten in Christendom, and the results of Greek learning were kept alive only in the Moslem world. The Antarctic problem disturbed no man's rest, and fired the fancy or adventure of no one.

The churchmen detected a fruitful source of heresy in the idea of a spherical Earth, and after a while found it contrary to Scripture; but it is pleasant to note that the Venerable Bede maintained the true view in England. In the first enthusiasm of Christianity worldly knowledge was brushed aside as not being essential to salvation. St. Basil, who did not himself deny the sphericity of the Earth, said:

"Of what importance is it to know whether the Earth is a sphere, a cylinder, a disc or a concave surface? What is of importance is to know how I should conduct myself towards myself, towards my fellowman and towards God."

Perhaps it was the belief in Antipodes, human beings inhabiting the side of the Earth opposite to the known

world, that was most obnoxious to the Christian Fathers. From the theological point of view belief in the existence of vast inaccessible lands inhabited by millions of people raised exactly the same difficulties as in the case of belief in the other planets being also inhabited. Were there separate Divine revelations to these people, were there separate Atonements?

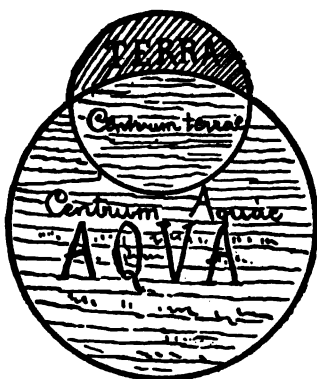
Thus the Antarctic problem became an element in theological controversy. St. Augustine met the difficulty in a philosophical spirit by distinguishing between demonstrated facts and mere speculation and his argument is worth quoting in the following translation from *De Civitate Dei*, kindly made by Dr. Sutherland Black:

“Further, as touching what they fable, that there are antipodes—that is to say, that on the opposite side of the Earth, where the sun rises when he sets to us, men plant [their] footsteps opposite to our feet—it is by no means to be believed. Nor, indeed, do they [who so allege] maintain that they have learned this by any historical knowledge, but, so to speak, they conjecture it by a process of reasoning [to the effect] that the Earth is suspended between the vaults of the sky and that the world occupies at one and the same time the lowest and the intermediate position, and from this they form the opinion that the other half of the Earth which is below cannot possibly be without human inhabitants. But they fail to observe that even although the world be believed, or even in some sort shown, to be of a rounded and spherical form, it does not, therefore, follow that the Earth also in that part is free from the accumulation of waters; nor yet even should it be thus free, would it forthwith follow of necessity that it should be peopled. For in no way does the scripture lie which when it relates the past produces

12 SIEGE OF THE SOUTH POLE

confidence in that its predictions are being fulfilled, and it is too absurd that it should be said that certain men had been able, the immensity of Ocean traversed, to sail from this side and arrive at the other so that there also the human race should be set up from that one first man. . . ."

To Augustine the trouble seemed to be to understand how the Antipodes could be descended from Adam, and the completeness of his theory as to the constitution of the City of God required that all men should be descended through Noah from Adam. His suggestion that the other side of the world might be entirely covered with

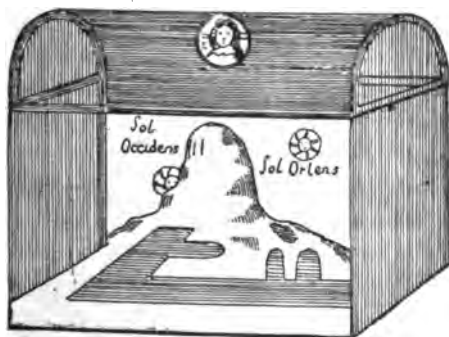


SPHERICAL EARTH WITH NO ANTIPODES.
(After Rainaud.)

water was worked out in a mediæval spherical Earth which could harbour no Antipodes, being devised on the principle that the lithosphere or solid globe need not be concentric with the hydrosphere or globe of waters. But centuries before this ingenious plan of avoiding the the-

ological difficulty was arrived at the spherical Earth was banished from Christendom on the plea that it was in contradiction to Scripture.

Lactantius early in the fourth century covered with ridicule those who could believe in so monstrous a conception as a spherical Earth, and without using any argument save "It is written" he denounced the whole theory as a Greek invention. Cosmas Indicopleustes, a monk who had travelled to India and could not reconcile his own observations with a flat Earth, set himself in the sixth century to the hopeless task of constructing an Earth out of his own head on the model of the Jewish tabernacle with a prodigious conical mountain in the midst for the sun to rise from and set behind.



THE EARTH ACCORDING TO COSMAS INDICOPLEUSTES.

It is an unedifying story. The temporary result was that in the mind of Europe the Earth became once more as flat as a pancake, and the wheel-maps of the Middle Ages reverted to the circular disc of the earliest Greeks. The Antarctic problem, after being stigmatised as heresy,

14 SIEGE OF THE SOUTH POLE

had been crushed out of existence. How serious the heresy was may be gathered from the fact that in the year 741 Pope Zacharias excommunicated an Irish priest named Virgil because he taught the doctrine of Antipodes "admitting the existence of souls who shared



WHEEL-MAP OF THE TWELFTH CENTURY.
(From Nordenskiöld's *Facsimile Atlas*.)

neither the sin of Adam nor the redemption of Christ." The bold Irishman probably recognised the truth of Augustine's argument and thought it unnecessary to suf-

fer to the utmost in support of a speculative fancy, for after twenty years he was consecrated Bishop of Salzburg, a pretty strong proof of his recantation.

The reign of Papal authority lasted long, but from time to time the ancient ideas found expression. Ptolemy's views leaked back into current thought from the tenth century onward through the Arabic translations brought to Europe by the Moors and made known by the writings of Isidore of Seville. Occasionally a speculative monk in drawing a wheel-map extended it far beyond the limits of the Old World, and like Macrobius represented some possibility of a southern temperate and even of a southern frigid zone. Speculation revived as to the existence of Antipodes to the west as well as Antipodes to the south. Roger Bacon, so far before his age in all that concerned natural science, openly declared his belief in them, and of course in the spherical form of the Earth.

The travels of Marco Polo opened the eyes of the awakening intellect of Europe to the immense eastward extension of the Old World, and made it clear for the first time that the Torrid Zone was no barrier of fire, but a path for Chinese and Arab trade in the far east of Asia and along the east coast of Africa. Marco Polo prepared the way for the translation of Ptolemy made by Angeles in 1410. The world was ready for this revelation and there is something of pathos in the sight of the first leaders of thought in modern Europe eagerly welcoming as the latest advance the work of the last of the Greeks. Long before this, isolated writers, such as Moses, a converted Spanish Jew, in the eleventh century, Michael Scott, the astrologer and reputed wizard, and Albert Trismegistus, the alchemist, had urged that the Torrid Zone was not

16 SIEGE OF THE SOUTH POLE

impassable on account of heat, and that it might be traversed though with great difficulty.

Europe at last became fully awake. In every department of intellectual activity the idle disputations in which the learning of the Schoolmen had its end were being discarded. Facts of natural science were no longer an-



THE MAP OF MACROBIUS.

swered according to the letter of Aristotle, but according to his spirit by direct appeal to nature. The art of navigation had greatly improved, the Northmen had discovered new lands far in the west, the compass had been invented, or adopted from the Chinese, and as a final spur to action the power of Mohammedanism passed from the cultivated Arab to the sanguinary and ignorant Turk.

This change was one of the most remarkable of the whole renaissance. The Turk burnt the Alexandrine library and the Pope admitted the sphericity of the Earth; the sceptre of intellect passed by these acts from Islam to Christendom, and the way was reopened to attack the problem of the Antarctic. The shifting of the balance of power began to press heavily on trade. The routes to the Far East were blocked by the Turk; but the products of the Far East had become indispensable to Europe. The possibility of a sea-passage to India became a pressing affair, and Ptolemy's *Terra Incognita* uniting the south of Africa with the Malay peninsula would bar the way; but here it appears that the early European geographers were not altogether inclined to follow Ptolemy, and many even of the wheel-maps show the Indian Ocean open to the south.

The problem of the sea-route to the East absorbed the attention of the Portuguese Prince Henry, of English descent on his mother's side, whose life-long efforts to promote maritime enterprise gained for him the surname of The Navigator. With the advent of Prince Henry we pass from speculation to exploration, and thanks to his vigorous initiative the clouds of ignorance which had obscured three-quarters of the Earth's surface for millenniums, began to roll away.

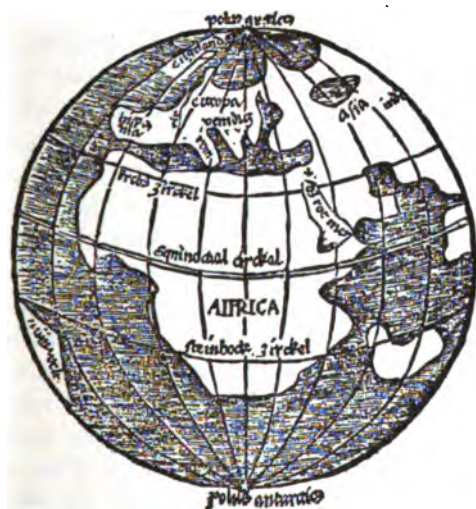
It is scarcely possible in the twentieth century for us to understand the horror of the unknown ocean which haunted the seafarers of the Mediterranean even so late as the beginning of the fifteenth century. It would seem as if the fancies of the ancient Greeks had expanded in vagueness and terror during the intellectual sleep until they became veritable nightmares. West of the Pillars of Hercules the portals of the pleasant Mediterranean,

18 SIEGE OF THE SOUTH POLE

where every coast-line had been neatly and accurately charted there lay an infinite expanse of water, but southward as the Torrid Zone was approached the sea became covered with darkness, the waves rose to mountain height, the wind dropped calm, the water itself evaporated into a saline mud in which dwelt monsters of indescribable size and variety. Blackest horror of all, the huge hand of the Devil himself would be thrust up above the boiling sea groping for wandering ships; one of the fantastic islands in the Atlantic on a mediæval map bears the title, *de la man de Satanaxio*. We hear at the present day of the superstitions of sailors, and multiplying these superstitions by the centuries which have passed since Prince Henry organised his pioneer exploration, we can dimly apprehend what the courage of the old mariners was, nerving them to contend against far greater obstacles than those interposed by Nature.

Year after year, from 1418 until he died in 1460, Prince Henry sent out his ships under stout skippers trained at his naval observatory at Sagres in the knowledge of Ptolemy and the Arabs, and posted up in all the information brought back by their contemporaries. The farthest south of these days was Cape Nun ($28^{\circ} 46' \text{ N.}$) long held impassable; it was passed by Gil Eannes in 1433 or 1434. Ten years later the dreary harbourless coast of the Great Desert was passed and the name of Cape Verde, the Green Cape, testifies to the joy and surprise of the navigators in their discovery that the Torrid Zone was not all Sahara, but contained fertile and inhabited land. The Navigator died long before the achievement of crossing the equator by one of the ships which followed voluntarily in the track which he had opened with the labour of a life-time. This occurred about 1470.

In 1487 Bartholomew Diaz sailed from Lisbon with three ships to look for the mythical Prester John in Ethiopia. He crossed the whole breadth of the Torrid Zone and his crew, first amongst sailors, realised the truth of the scientific deduction that a second Temperate zone lay beyond. After erecting a monument at Cape Voltas



THE SEA ROUTE TO INDIA. AN EARLY MAP.
(From Nordenskiöld's *Facsimile Atlas*.)

(26° S.) Diaz was driven by a storm far out into the South Atlantic and for thirteen days his flotilla was at the mercy of the winds. The weather grew bitterly cold and his men might well believe they had crossed the Temperate zone as well and were driving towards the new terror of a South Frigid Zone, for they were in the great current partly of Antarctic, partly of abysmal oceanic water

20 SIEGE OF THE SOUTH POLE

which wells up against the southwest coast of Africa and streams northward along the land. When the storm was over Diaz steered east to meet the coast, but after some days seeing no land he altered his course to the northward and anchored in Algoa Bay. There is no doubt that he had reached and passed the fortieth parallel of south latitude before making the south coast of Africa. To his delight, but to the alarm of his crew, the coast continued to trend eastward, and but for the inevitable mutiny that played a part in almost every voyage of the period Diaz would have anticipated Vasco da Gama in discovering the sea-route to India. He opened the way to it, however, by showing that Africa had undoubtedly a southern termination in a temperate climate, where there were living people, those very Antipodes to believe in whom had for centuries been the rankest heresy.

How far Prince Henry knew that Africa was a great peninsula before he began his efforts to sail round it we cannot say. There are rumours of a chart of oriental origin showing the Cape of Good Hope and a route round it to India; there is little doubt that the Arab traders on the east coast of Africa knew that there was free water communication to the southwest; and on Fra Mauro's map of 1495 Africa was shown free to the south. There is, however, all the difference in the world between vague report and actual demonstration, and nothing that has been discovered as to prior knowledge can detract from the credit due to the Portuguese for their magnificent perseverance in pushing their way to the farthest south. They proved that long voyages were possible, that the dangers of navigation on the high seas were far less than had been supposed, and they brought home proofs of the form of the Earth that even the common sailor and the

man in the street of those days could not fail to understand.

From the last years of the fifteenth century the Church encouraged maritime exploration and it would be hard to say whether missionary zeal or commercial enterprise or political ambition was the strongest motive power in the great age of discovery which was now inaugurated.

The voyage of Vasco da Gama in 1497 gave a definite outline to Africa and shattered any lurking suspicion that the *Terra Incognita* of Ptolemy might possibly be attached to that continent. Columbus had meanwhile sailed westward and found what he believed to be a short cut to India, with some indications of an extensive land to the south of the West Indies which he supposed to be the extreme southeast of Asia. On his outward voyage Vasco da Gama discovered that by sailing southwest from Cape Verde he could make use of the northeast trade winds and then turning southward, get across the belt of calms where it was narrow, and into the westerly air current, which would carry him round the Cape of Good Hope, and he advised his successor, Cabral, to take that route. In following these instructions Cabral found himself farther west than he had intended and discovered what he took to be a new island which he named Terra Santa Cruz. One of his ships returned to Lisbon with the news while Cabral continued his voyage to India.

Two expeditions were sent out in 1501 and 1503 by the King of Portugal to explore the new island, and a Florentine named Amerigo Vespucci took part in each. Vespucci wrote an account of the voyages and although he was neither the leader of the expeditions nor a Portuguese his name became attached to the new land in the form America. Controversy has raged about the char-

22 SIEGE OF THE SOUTH POLE

acter of Vespucci, who is hailed on the one hand as a gifted discoverer, and on the other as a lying adventurer. Possibly he was only a very ordinary person writing with the uncritical carelessness of an amateur on matters which interested him, but which he did not fully understand. Anyhow his letters are all that remain as a record of the expeditions and from them we learn that on reaching the coast of the New World between 5° and 8° S. the first expedition in 1501 found that Santa Cruz was no island but the coast of Brazil, evidently part of a great continent, which was followed far to the south. Vespucci declared that he had reached 52° S., being driven by a great storm, and there discovered a bleak inhospitable land with steep cliffs, rendering a landing impossible, but the weather was too foggy to admit of further exploration. Unfortunately for himself Vespucci made the remark that at that latitude the night was fifteen hours long; but for a night of fifteen hours on April 2nd (his assigned date) it is necessary to be in latitude 72° S., and he certainly was not there. It seems most probable that the land seen was some part of the Patagonian coast.

On the second voyage of the Portuguese (in 1503) their instructions were to follow the coast of Brazil southward and search for a passage to the west in order to reach the much desired goal of the spice islands of the Moluccas; but it was unsuccessful and reached no farther south than 20° S.

An interesting expedition followed the second voyage of Vespucci, the first in which a non-Iberian nation took part. A Norman noble the Sieur de Gonville being at Lisbon was fired with the stories of the wealth of the Far East, and, securing the services of two Portuguese

NOT TRUE →

sailors who had already made the voyage to India, he set out for that brilliant goal in the *Espoir of Honfleur*. Two months after he had crossed the equator he perceived signs of land in floating seaweeds and believed he was approaching the Cape of Good Hope. A violent storm sprang up and drove the ship back into the zone of calms, and two months later (presumably after resuming the southward course) land was sighted and a landing made. From this Southern Land de Gonneville brought a native back to France about whose subsequent fate picturesque tales are told. He is said to have married a French lady of noble family and his descendants more than two centuries later are reported to have set sail in search of their remote fatherland. Theoretical geographers have located de Gonneville's Southern Land in Australia, Africa, Madagascar, North America and South America as it suited their views; the balance of probability seems to point to southern Brazil as the real landfall.

In 1514 two Portuguese ships returned to Lisbon from the coast of America. They belonged to the great commercial house of Haro but their captains are unknown. The only record of the voyage is a long report written by the Lisbon agent of the famous German firm of Fugger in Augsburg in whose archives the original MS. was recently found. It had been printed at the time under the title of "*Copia der Newen Zeytung aus Presillgt Landt*," and became widely known. The gist of the "new tidings from Brazil land" is that the southern extremity of America was found by Haro's ships in 40° S. and that to the south of the broad channel washing the cape appeared the coast of the great South Land.

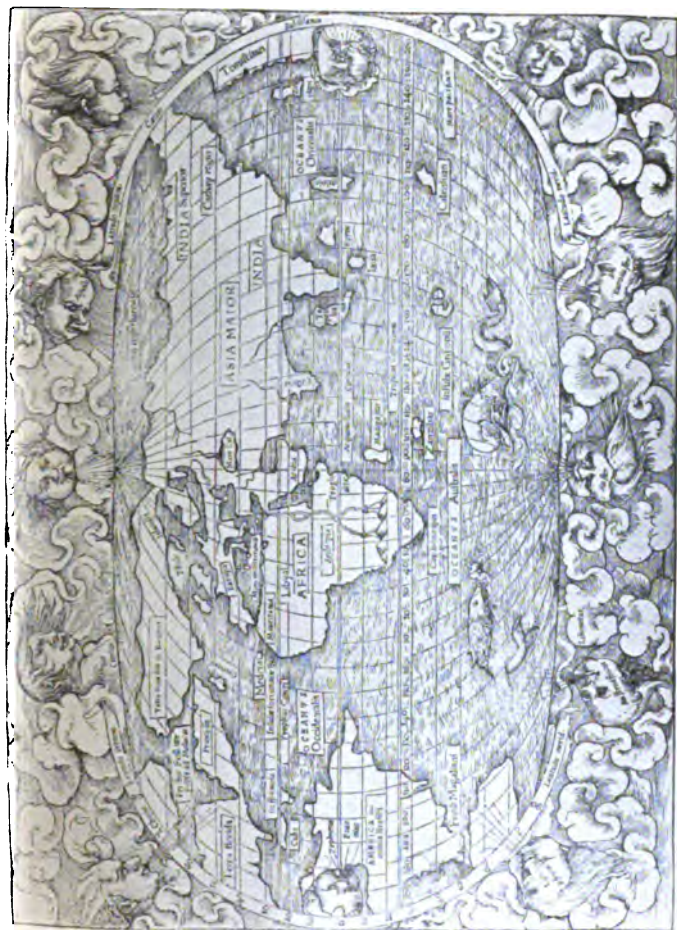
There was naturally keen rivalry, political, commer-

24 SIEGE OF THE SOUTH POLE

cial and religious between the Portuguese and the Spanish explorers and at an early date they had appealed to the Pope to settle their disputes. This the Pope did by assigning the eastern hemisphere to Portugal and the western to Spain, the meridian separating the two passing through the Atlantic. The famous Line of Demarcation was not easily adjusted to suit both parties but in its final form it was the meridian of 46° W. in the Atlantic and 134° E. on the other side of the globe. Thus it came about that the fruits of Cabral's discovery so far as a route to the Spice Islands were concerned fell to the share of Spain, and it was from Spain that the greatest hero of this great age of discovery set sail, although he was himself a Portuguese, Ferdinand Magellan.

Magellan sailed in September, 1519, found the coast of Brazil in the neighbourhood of Rio de Janeiro in December, coasted southward, and very carefully examined the broad opening of the Rio de la Plata by which he had hoped, probably on the strength of the "Newen Zeytung aus Presillgt Landt," to find a passage westward. Convinced by the shallowness and freshness of the water that there was no passage there, he pursued his course, searching every bay until the approach of the southern winter made it necessary to seek a secure harbour. This he found in Port St. Julian $49^{\circ} 30'$ S. where he stayed five months, and there he informed his officers that he would go on seeking for a passage as far as 75° S. if necessary.

On October 21st, 1520, the squadron sighted a headland, which was named, in accordance with the Roman Catholic custom so valuable to the historian of early travels, after the saint of the day, in this case the Eleven Thousand Virgins. It was situated in 52° S. the highest



The Continuous Southern Ocean.
(From Nordenskiöld's *Facsimile Atlas*.)

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.

south latitude so far reached with certainty, and by the side of the cape a channel opened deep, salt and with a strong current running through, the long-looked-for passage to the west. With the further labours of Magellan we have little to do. He crossed the wide Pacific in a voyage of three months' duration in which no land was sighted but two wide-separated barren islands. One ship of his squadron, the *Victoria*, after his untimely death, threaded the maze of the Malay archipelago and crossing the Indian Ocean returned to Spain by the Cape of Good Hope. The *Victoria* turned a furrow of blue water round the globe and taught Europe by that simple demonstration that the Earth was indeed a sphere, or at least that it was round, taught it also that the Old World and the New World alike were free to the south and that a third world, if such existed, must be looked for in the vast unknown area about the Antarctic pole.

That a "third world" did exist was a cherished belief, no doubt derived from the old Greek speculations and reasoning based on the law of symmetry. Magellan did much to confirm the idea, for when he passed through the strait that bears his name he saw to the south of him land as continuous and as continental in appearance as the territory of the Patagonians to the north. This southern land he named *Tierra del Fuego*, the land of fires, apparently from the fires carried by the natives in their canoes.

While the question of the existence of an Antarctic region had been settled definitely by the acceptance of the sphericity of the Earth, and the mode of access to that region had been shown by Magellan to be by the sea alone, it still remained doubtful whether it was an antarctic sea or an antarctic land that lay inviting dis-

26 SIEGE OF THE SOUTH POLE

covery. Map-makers picking up their scraps of fact as they could, from the descriptions of Ptolemy, the authentic logs of recent voyages or the stories of sailors, were obliged or at least felt themselves impelled to work these facts into some sort of setting that gave their drawing an air of completeness. They had to fall back for this purpose on the old ideas of symmetry or analogy or else to draw upon their imagination—a more abundant source and much more easily tapped. It is not surprising that the globes of the sixteenth century varied vastly in their details.

Leonardo da Vinci on his globe of 1515 depicts America and Africa separated by broad stretches of ocean from a continent almost included in the Antarctic circle, which would have been a marvellously lucky guess at the truth had there been any indication of a possible Australia. The globe of Schöner in 1515 also showed America and Africa free, but obviously on the strength of the "Newen Zeytung aus Presillgt Landt," America was represented as terminating in latitude 40° S. and nearly touching a huge ring-shaped continent almost encircling the globe and enclosing a sea which filled the Antarctic circle. This continent was laden with detail of mountains and rivers, and the part south of America was named *Brasilie regio*. Schöner's globe of 1520 named the land south of America stretching from 40° to nearly 80° S. *Brasilia Inferior*. The map of Orontius Finné, published in 1531, seems to combine the information of the two foregoing with Magellan's discovery, for it shows a vast continent covering the whole Antarctic area coming close to America, keeping more distant from Africa, but swelling out in the south Indian Ocean almost to the tropic in a great square projection called *Brasilie*

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Regio, to the east of which a large peninsula attached by a very narrow isthmus was named *Regio Patalis*. The whole continent bore the inscription "Terra Australis recenter inventa sed nondum plene cognita." The outline of the *Regio Patalis* irresistibly suggests Australia and has given rise to much controversy as to the early discovery of that continent. French maps of the same date, and, curiously enough, French maps only, showed the island of Java separated by a narrow strait from a huge shapeless island called "Jave le Grand," which covers a great part of the area really occupied by Australia, but stretched on some maps as far as 60° S. This also suggested to some writers an early discovery of Australia by unknown Frenchmen.

However, these things may be we cannot be far wrong in accepting the map of Orontius as representing the current views of the middle of the sixteenth century as to the nature of the southern hemisphere. The vast *Terra Australis* built entirely of conjecture save for the *Tierra del Fuegian* scrap of fact, was a continent indeed "not yet fully known," the finding of which would well repay any explorer, and place the happy discoverer on a pedestal beside Columbus and Vasco da Gama, perhaps even as high as Magellan himself. It was a magnificent stimulus and the following chapters trace its historical results.

CHAPTER III

SEARCHING FOR THE SOUTH LAND

"We left behind the painted buoy
That tosses at the harbour mouth;
And madly danced our hearts with joy,
As fast we fled to the South;
How fresh was every sight and sound,
On open main or winding shore!
We knew the merry world was round,
And we might sail for evermore."

—TENNYSON.

FOR two hundred years the fair image of the South Land fled before the bold sailors who entered the southern seas in quest of trade or plunder. They ever kept a watchful eye to southward in the hope of lighting upon the Third World, the richness and attractiveness of which seemed to increase from generation to generation.

Unfortunately it is difficult to unravel the stories of the voyagers of the sixteenth and seventeenth centuries. It is true that "the men loomed large on the long trail, the trail that is always new," but their forms are rarely distinct. The vagueness of their original narratives often set down from hearsay by another hand, the uncertainty of determining latitude to a single degree by means of the clumsy back-staff or cross-staff, and the wild guesses at longitude that were alone possible, makes the story of any particular voyage hard to follow, and the contests as to priority of discovery very difficult to

umpire. But an even greater difficulty is introduced by the diametrically opposite views arrived at by different geographical experts after critical study of all existing data. If one could believe all the evil that has been spoken of the early explorers, and of some of the later as well, the only possible conclusion would be that the most detestable scoundrels of all nations and they alone were hardy enough to undertake maritime enterprise. If one were to believe all the good that is spoken of these same men by authorities equally high, they were without exception high-souled heroes of whom the world was not worthy, animated by none but the loftiest motives, incapable alike of error in their observations or of exaggeration in their statements. The truth must lie between the two extremes, and we shall follow the views which appear the most reasonable in setting out a chronological narrative of the attempts to reach that ghost of an antarctic continent which the fancies of cartographers had conjured up. We have no prepossessions in the matter, are ready to revise our opinions on obtaining any fresh evidence, and not prepared to take up the cudgels of controversy in respect of any of the views set forth.

All through this period the means of publicity were small, and as a rule the desire for publicity on the part of explorers was even smaller. The balance of power in Europe depended so intimately on the possession of exclusive information that authentic charts were jealously guarded as State documents of the highest value, the communication of which to a foreigner was an act of treason. There is reason to believe that false reports were sometimes deliberately made public in order to deter rivals, and there can be no doubt that malicious slanders were circulated as to persons whose knowledge

30 SIEGE OF THE SOUTH POLE

was inconvenient to those in authority. It is accordingly not surprising to find that many facts to which we now have access were unknown to the contemporaries of the actors themselves, whose efforts and discoveries were thus often left unproductive and lay outside the chain of historical continuity.

The Emperor Charles V. sent out an expedition in 1525 to repeat the voyage of Magellan and one of the caravels, the *San Lesmes*, encountering one of the violent storms that haunt the southern extremity of America, was driven far to the southeastward of the entrance to the strait, and in latitude 55° found an open sea leading the captain to believe that he had come to the southern end of *Tierra del Fuego*. This fact never found its way into contemporary maps, but the difficulties of the southwest passage to the Indies were fully appreciated by the Spanish sailors. They had a much easier and safer route by Mexico, a route which obviated the storms of the Southern Ocean and the tedious and hazardous navigation of the Strait, and which also reduced the voyages of the Spaniard living at home to the short and easy trip to Mexico, while his colonial brother undertook the trans-Pacific voyage from one of the ports on the west coast of America, all of which were bound together by a regular service of coasting vessels. For forty years the Spaniards deserted the Strait, but diligently continued their navigations in the great South Sea.

The Portuguese trader, Jorge de Meneses, while on a voyage from Malacca to Ternate in 1526, was drifted out of his course and fell in with the coast of a vast projection of the great South Land. The discovery was not followed up and twenty years later a Spaniard Ynigo Ortiz de Retes, in the *San Juan*, after passing a number

of islands, met with an extensive land of which he followed the north coast for about 230 leagues without coming to an end. Henceforth this portion of the Southern Continent appeared upon the maps under the name of New Guinea, which it still bears. It was easy to draw a continuous coast line across the Pacific to unite it with the Magellanic Land, nor were there wanting adventurous sailors to visit portions of that coast and return with detailed descriptions. Thus Dr. Juan Luis Arias some time between 1606 and 1621, no doubt animated by the stories of Quiros, wrote a Memorial to Philip III., King of Spain, in the true spirit of expansive imperialism, urging that monarch to proceed to annex and colonise the new continent without delay, for it had been discovered by the intrepid pilot, Juan Fernandez, about 40° west of the coast of Chile, a pleasant land, fertile, temperate in climate, watered by great navigable rivers, like nothing one could see in Chile or Peru, and to crown all, inhabited by white people. So, long before Defoe immortalised the adventures of Alexander Selkirk on the island really discovered by Juan Fernandez and named after him, a romance was woven round some Polynesian island visited by the same navigator, and the prevailing belief in a non-existent region strengthened thereby.

In 1567, Pedro de Sarmiento, succeeded in inducing the Viceroy of Peru to fit out an expedition to explore the South Land, but though he was made captain of one of the vessels the command of the expedition was given to Alvaro de Mendaña, nephew of the Viceroy, who took a course of his own, little dreaming that the route urged by Sarmiento would have led to the discovery of Australia. The only result of the voyage was to find a

32 SIEGE OF THE SOUTH POLE

group of large islands, some of which the explorers believed to be connected by land with New Guinea, and as some gold was picked up, though neither apes nor peacocks were found, they called them the Solomon Islands on account of their resemblance to Ophir. This partial success stimulated Mendaña to continue his explorations, to the brilliant conclusion of which we shall refer presently.

The scene of interest shifts back to "where wild meeting oceans boil besouth Magellan," and for the first time an English explorer appears on the stage, no less heroic a figure than Sir Francis Drake, the boldest buccaneer of the Elizabethan age when the sphere of the "ten commandments" did not extend beyond the mouth of the Channel and every man who owned a ship was free to make his fortune as seemed right in his own eyes on the high seas. Drake who cared nothing for the Pope's Line of Demarcation, or the Spaniards' valour, much as he appreciated their galleons, set out in 1578 "to seek that strait in which the vulgar believe not but the reality of which is confirmed by many cosmographers." He found the strait, passed through into the Pacific in the remarkably short time of 18 days and after sailing some distance to the northwest met with one of the gales of the region and was driven far to the southwest. He was in latitude "57° or somewhat better" before he recovered control of his ship. He had reached the farthest south yet attained, though still nine degrees north of the Antarctic circle within which a distorted report of his voyage in De Bry's great compendium of travels represented him as having been driven. Drake found himself soon after in the neighbourhood of a group of islands which he named the Elizabethides after the Queen, and turning northward came on

the south coast of a land in 55° S. These islands were undoubtedly part of the insular labyrinth of Tierra del Fuego, but they were shifted about on the map like pawns on a chess-board by the cartographers of the following generation until "Drake Land" figured as a respectable promontory of the great South Land itself.

Although a pirate, Drake, in his own erratic way, was a pious man and carried a chaplain, the Rev. Francis Fletcher, who as the author of "The World Encompassed," was also the chronicler of the voyage. Although his master once set him in irons on board, with the inscription on his arm "frances fletcher ye falsest knave yt. liveth" we may accept the chaplain's statement: "at length wee fell with the uttermost part of land towards the South Pole, and had certainly discovered how farre the same doth reach Southward from the coast of America aforementioned. The uttermost cape or hedland of all these Ilands stands neere in 56° deg., without which there is no maine nor Iland to be seene to the Southwards, but that the Atlanticke Ocean and the South Sea, meete in a most large and free scope."

Richard Hawkins, (whose identity as a prisoner of the Spanish is quaintly veiled in Don Ricardo Aquines, and in German translations Reichard von Aquin), also a famous buccaneer states his own view confirmed by a conversation with Drake, as follows:

"If a man be furnished with woode and water and the winde good, he may keepe the mayne sea, and goe round *about the straits* to the southwards and it is the shorter way; for besides the experience which we made, that all the south part of the straites is but ilands, many times having the sea open, I remember that Sir Francis Drake told me, that having shott the straites, a storm first took

34 SIEGE OF THE SOUTH POLE

him at northwest, and after vered about to the southwest, which continued with him many dayes, with that extremitie, that he could not open any sayle, and that at the end of the storme, he found himselfe in fiftie degrees* which was sufficient testimony and prooffe that he *was beaten round about the straites.*"

There is thus no manner of doubt that Drake had proved Tierra del Fuego to be a group of islands and not part of any Antarctic Continent; but his record was misunderstood, he himself thought little of it and does not appear to have given a name to the "extreme cape or cliff" which probably enough was that which Le Maire and Schouten in 1615 after passing through Strait Le Maire and sighting Staten Land called Cape Hoorn after one of their ships, a name since only too familiar to the deep-sea sailor as The Horn.

The next important event in the history of the Antarctic possibly occurred twenty-one years later, but whether it occurred or not is one of those puzzling questions to which an answer is difficult. The story, which has been accepted by many students of the history of discovery, is to the effect that a small Dutch vessel, the *Blijde Boodschap* (Blithe Tidings), under the command of Dirk Gerritsz, one of the famous Dutch squadron of "the Five Ships" bound to the Indies for trade and plunder, after having cleared Magellan Strait and reached 50° S. in the Pacific, was driven back by a storm to 64° S. where a mountainous snowy coast like that of Norway was discovered, extending apparently to the Solomon Islands. It has been generally believed on the strength

* Probably an error of a copyist who mistook "56" for "50"; it is scarcely probable though not impossible that longitude and not latitude is meant.

of this report that Dirk Gerritsz was the discoverer of the South Shetlands and his name has recently been attached by the leading German cartographers to the whole archipelago lying south of 61° in the longitude of Tierra del Fuego. From the record of the other vessels of the squadron, we learn that the leader, Olivier van Noort, had received a letter from Dirk Gerritsz, stating that he had missed the appointed meeting place at Santa Maria Island, ran short of provisions, reached Valparaiso in great distress and was wounded and taken prisoner by the Spaniards. Not a word was said as to any discovery of land in the far south. This was first heard of in some supplementary notes incorporated in the introduction to Herrera's "History of the Doings of the Spaniards in America," by Kasper Barlaeus, who translated that Spanish work into Latin in 1622.

It seems likely that Gerritsz's name was associated by mistake with the report of quite another voyage, and the origin of the mistake, as pointed out by Mr. E. S. Balch, is probably a manuscript dating from the end of the seventeenth century, which is preserved in the Royal Archives at The Hague. It commences:

"Laurens Claess of Antwerp, aged about 40 years, has served as boatswain on the Magellan ship *Blijde Bootschap* which sailed with other ships . . . in 1598 . . . has served under the Admiral Don Gabriel de Castiglio with three ships along the coast of Chile towards Valparaiso and from there towards the Strait, and that in the year 1603, and he went in March to 64° degrees where they had much snow."

No mention is made of land, and it would seem that Dirk Gerritsz's old shipmate had really approached within a few degrees of the Antarctic circle on board a Spanish

36 SIEGE OF THE SOUTH POLE

ship. A confused report of this exploit may very well have inspired Barlaeus. The statement that the snow-clad coast-line imputed to Dirk Gerritsz probably extended to the Solomon Islands, is plainly a speculation of an armchair geographer, and obviously emanates from Barlaeus; but we have now to follow the mythical coast-line to the new land of Ophir, for the centre of interest in the first half of the seventeenth century lies there.

Mendaña was accompanied on a second voyage of exploration, with which we are not concerned, by a Portuguese pilot named Pedro Fernandez de Quiros, who is hailed by one authority as the true hero of the unknown South Land, and stigmatised by another as a lying Münchausen. In any case he was an interesting figure and he played a picturesque part in the history of exploration. On Mendaña's death, Quiros after a vain attempt to get the Peruvian viceroy to provide funds for a great expedition to the South Land, went to Spain like Columbus, to whom he compared himself, to move the King in the matter. He went first to Rome and laid before the Pope a touching picture of the untold millions of South Land natives ready to be led into the fold of the Church; the Pope recommended him to King Philip III., to whom Quiros promised new lands greater in extent than those he already possessed and the funds were secured.

Quiros set out from Callao in December, 1605, with three ships to explore the coast of the South Land from Tierra del Fuego to New Guinea, accompanied by six Franciscan missionaries. After encountering much bad weather and often changing his course he reached a small island in the group, afterwards called the New Hebrides, which from its height, its inhabitants and other

signs he took to be a promontory of the great Terra Australis Incognita. He named it *Australia del Espiritu Santo*, and took possession with a pomp, ceremony, and comprehensiveness that has perhaps never been surpassed. He landed with his soldiers and priests, set up his standards and the cross, and hailed his discovery with the words "To God alone the praise and glory! O Land so long sought for, believed in by so many, so earnestly longed for by me." Then a notary solemnly called Heaven and Earth, the Waters and all Creatures to witness that Captain Pedro Fernandez de Quiros took possession in the names of the Holy Trinity, the Pope, the Franciscans, various other orders, and lastly, the King of Spain. The definition of the territory annexed was given thus:

"In this southern quarter of the globe which has hitherto been unknown, to which I have come with the permission of Pope Clement VIII. and by command of King Philip III. of Spain, dispatched by his Council of State, I, Captain Pedro Fernandez de Quiros take possession in the name of the Holy Trinity of all islands and lands which I have recently discovered and will discover even to the Pole."

Yet notwithstanding all this Quiros went no further south; he lingered more than a month at his island, and planned a town to be called New Jerusalem at the mouth of the Jordan. Soon after sailing, the ships of the squadron were separated by a storm. Quiros returned to Peru via the Philippines, and Torres, his second in command, discovered and navigated the strait which now bears his name, thus proving that New Guinea was not part of the southern continent, and discovering new land to the south. Quiros, the would-be Columbus of the south,

38 SIEGE OF THE SOUTH POLE

passes out of sight protesting loudly that his discovery was a land of gold and silver, cattle and grain, the richest fruit and the healthiest climate, a land without venomous beasts or insects, peopled by gentle natives, a land richer than Mexico or Peru and as large as all Europe and hither-Asia as far as Persia.

Meanwhile the Dutch voyagers sailing south from the Malay archipelago had discovered the Gulf of Carpentaria, where Jansz arrived a few months before Torres; and year after year the west coast of Australia was felt out; and its bays and headlands bear testimony to this day to the hardiness of the Dutch captains and the names of their ships. In 1627 Nuyt discovered that after passing Cape Leeuwin the coast turned eastward, and Tasman crowned the work by sailing round the coast and cutting off the great mass of New Holland from the dwindling hypothetical continent. Continuing on his way he discovered the west coast of New Zealand, which he named Staten Land in honour of the Dutch States General. He thought that it might perhaps be continuous with the other Staten Land east of Cape Horn; but in any case he was of opinion that the new discovery formed part of the unknown South Land.

Except possibly in the middle of the three southern oceans it was now apparent that the Antarctic continent could not reach very far into the temperate zone. This was the utmost of the achievements of the sixteenth century, and so far as attaining high latitudes is concerned, the best results were due to the tempests off Cape Horn, such expeditions as set out with the professed intention of pushing on to the great South Land having usually been well content to harbour in some tropical island.

In the Cape Horn region the hopes of meeting with

the coast of the South Land were gradually dispelled. Hendrik Brouwer in 1643 being unable to make Strait Le Maire turned eastward along Staten Land and found it to be an island of no great size. He also professed to have found new land farther to the east, but his discoveries were so vaguely described that they failed to gain general belief. In 1675 a merchant named Antony La Roche, returning from the South Sea, encountered a strong current off Strait Le Maire which carried him far to the east, where he discovered a snow-covered land, possibly the Falkland Islands—one of the most frequently discovered, named and forgotten groups in all the seas—but perhaps it was South Georgia with which the snow-covering in April agrees better.

During the years towards the close of the seventeenth century the English buccaneers made more use than almost any other navigators of the seas about the Horn, and the stories of their adventurous voyages abound in accounts of storms driving them south amongst the ice. They were forced into such positions sorely against their will and all their efforts were devoted to escaping northward again. Little information is to be derived from their logs except concerning the severity of the weather and the misery of working the ships in that region of "floe and snow and blow." It may be that some of the ships reached high latitudes, but the total absence of observed longitudes deprive the record of any geographical value. Bartholomew Sharpe is believed to have reached "near 60° S." in 1681, Ambrose Cowley 60° in 1684, and Edward Davis "very near 63°" in 1687 in the South Atlantic. Davis had a short time previously lighted on a new land in the South Pacific, far off the coast of Chile, which although only the little Easter Island, gave

40 SIEGE OF THE SOUTH POLE

the speculative cartographers another point in the coast line of their illusive land.

The only result so far as the search for the South Land was concerned was to warn intending discoverers that there was no prospect of success to the south of South America. Cowley indeed draws a quaint moral of his own, for the storm struck his ships while the men were "chusing of Valentines and discoursing on the Intrigues of Women" one 14th of February, "so that we concluded the discoursing of women at sea was very unlucky and caused the storm."

The seventeenth century closed with the belief in a Terra Australis Incognita undiminished by the very substantial increase of the known world in the southern hemisphere; but it closed with the first special expedition to investigate a purely scientific problem.

How the question was approached by the scholars of the day, and to what extent their knowledge went, may be judged by two extracts from the learned Dr. Nathanael Carpenter in his "Geographie," second edition, published in 1635. The first illustrates the way in which such scholars played with ideas:

"It hath beene a usuall kinde of speech amongst men to tearme such things as are stronger, worthier or greater, *Masculine*; on the contrary side such things *Feminine* as are found deficient or wanting in these perfections; by which kinde of Metaphor taken from the Sexes in living creatures they have ascribed to the Northerne Hemisphere a Masculine Temper in respect of the Southerne, which comes farre short of it."

The second quotation is a good summary of known facts and a typically English view of foreign character:

"Of the third and greatest, which is the South Con-

tinent, no conjecture can be well-grounded, being in a manner all undiscovered, except some small quilletts on the borders of it; by which if we may judge of all the rest, we shall almost give the same judgment as of the other. The want of discovery in this age of ours wherein navigation hath beene perfected and cherished, is no small argument to prove it inferiour in commodities to other places: Neither had the slacknesse of the *Spaniard* given that occasion of complaint to *Ferdinand de Quir*, the late discoverer of some of these parts, had not the *Spanish* king thought such an expedition either altogether fruitlesse or to little purpose. For who knowes not the *Spaniard* to bee a nation as covetous of riches as ambitious to pursue forrane Soveraignty: as such who will more willingly expose the lives of their owne subjects, then loose the least title over other Countreys."

Halley, the English Astronomer Royal, had spent the whole year 1676 on St. Helena making systematic magnetic observations with a view to completing his theory of terrestrial magnetism which was published in the *Philosophical Transactions* in 1693. The theory met with keen opposition, and feeling the need of additional data to support his views, Halley applied to the government for the means of extending his observations farther into the Southern Hemisphere. This was granted, and the astronomer, invested with a captain's commission, was placed in command of H. M. S. The Paramour Pink in 1699, with instructions to study the variation of the magnetic needle in different latitudes and to discover any of the new lands supposed to exist in the South Atlantic. The first purely scientific expedition by sea under the British or any other flag was in some ways unfortunate.

42 SIEGE OF THE SOUTH POLE

While the Royal Observatory at Greenwich was and is very intimately associated with the Royal Navy, it was not to be expected that the head of the Observatory could at a moment's notice take command of a ship of war. In those days of course the navy was not so specialised a profession as it is now, and captaincies and even higher posts could then be bestowed without scandal on persons who were not qualified to exercise the duties attached to their office. It was in fact a convenient way in which a leading politician could reward his friends to place them on the books of a ship or of a regiment. Such appointments were even given to children and served merely as an excuse for an annuity from the public funds. But Halley was called upon not only to draw the pay but to exercise the executive duties of a captain in command of a crew engaged upon uncongenial and to them incomprehensible work. It is not astonishing that difficulties arose and that the rough sailors of those days resented the efforts of their amateur captain to maintain discipline. The wonder is that any scientific work was possible in the circumstances. Halley succeeded in making excellent magnetic observations, he landed at St. Helena and repeated his experiments there, and then steered southward. In January, 1700, he met with floating ice in latitude 52° S. and longitude 167° W. of Ferro. The vessel was not prepared for ice-navigation and got into a position of considerable danger so that it became necessary to return northward immediately. No new land was seen, but some indications of land appeared in latitude $43^{\circ} 12'$ S. and longitude $49^{\circ} 32'$ W., while the presence of birds in $43^{\circ} 51'$ S., $25^{\circ} 50'$ W., suggested the possibility of land existing in that neighbourhood.

As one result of this voyage Halley was able to con-

struct the first map of magnetic variation, and as another he introduced a method of determining longitude by observing occultations of the fixed stars. These were two substantial gains to navigation, for hitherto the problem of the longitude had been practically insoluble.

The solitary scientific expedition toward the south was merely an incident without any direct consequences to exploration. The mercantile or piratical adventurers of England continued to visit the southern seas and several times were driven south of 60° . Dampier in his famous circumnavigation, although attaining no high latitudes, helped to cast doubt upon the existence of a great southern continent by observing how frequently the coast-line marked on the charts was found to have no basis in fact. One of his comrades, however, John Welbe by name, was convinced of the existence of such a land, at least he addressed many memorials in 1713 to the Admiralty and the Treasury asking for a ship with 180 men in which he could explore the coast of the continent between Cape Horn, the Land of Juan Fernandez and New Guinea; but the Admiralty and Treasury had other things to think about and remained silent.

It would serve no purpose to recall the names of all the sailors of this period who were driven south of 60° while rounding the Horn, but George Shelvocke may be mentioned because his particular storm in 1719 was imputed by his superstitious mate to the presence of a "disconsolate black albitross" which followed the ship, and after several vain attempts the mate shot the bird. It did not die in vain, for the report of the episode suggested to Coleridge the poem of the Ancient Mariner.

In 1721 Jacob Roggeveen submitted a scheme for a voyage of southern exploration to the Dutch East India

44 SIEGE OF THE SOUTH POLE

Company, similar to one proposed by his father fifty years before, and accepted by the Company, but postponed indefinitely on account of the war then in progress. The political conditions being now happier the Company at once accepted the proposal, and the younger Roggeveen was granted three ships to explore the Southern Seas and to search for the Isle of Gold, a half mythical, half traditional island in the neighbourhood of New Guinea.

The Dutch expedition set out in August, 1721, visited the Falkland Islands, naming them *Belgia Australis*, and tried to enter Strait Le Maire. Here the usual fate awaited them, a northerly storm sprang up and drove the squadron far to the south beyond 62° S., one of the ships, the Thienhoven, being reported to have reached $64^{\circ} 58'$ S. This position cannot be affirmed with any certainty, and like all the high latitudes previously attained, it was made much against the will of the explorers, who never intended to seek that part of their great continent which lay amongst the Antarctic ice. The Dutch voyagers did not doubt that the southern continent lay to the south of them; the abundance of ice, which was believed to form only near land, the birds, the direction of the currents in the sea were all taken as evidence of the proximity of land. The land they considered might very possibly be inhabited, for the shores of Davis Strait were inhabited all the year round at least as far as 70° N.

Roggeveen proceeded to search in the Pacific for Davis Land, he sighted Easter Island, but not dreaming that so insignificant a speck could cast so vast a shadow on the map he continued sailing northwest, although his companion Behrens regretted that a southwesterly course had not been taken. When at a later date Roggeveen

wished to turn south and explore the Staten Land east of New Holland, he was prevented from doing so by the representations of his ship's company, and proceeding into the tropical Pacific he discovered Samoa, and in 11° S. the islands of Thienhoven and Groningen, which he hailed as promontories of the South Land. We may take leave of Roggeveen chanting the praises of that terrestrial paradise, the great Southern Continent, its vastness, richness, accessibility, delightful climate and the rest, in language worthy of Quiros himself, and no doubt largely derived from that poetical explorer.

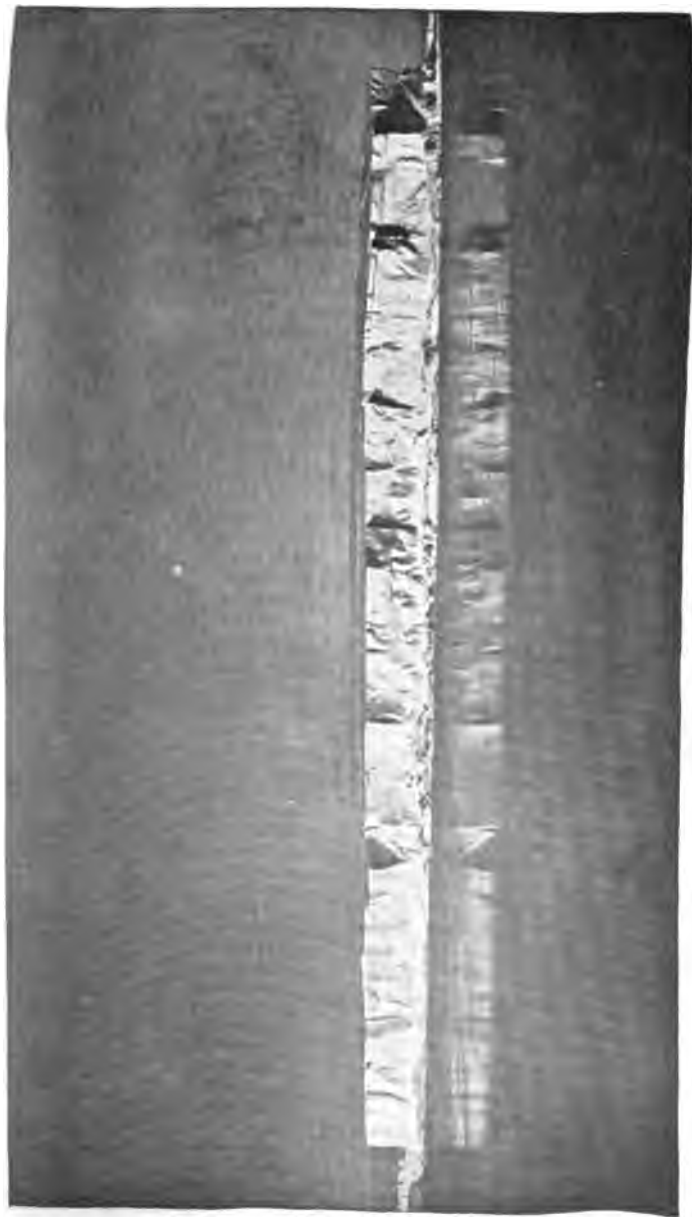
The old story of De Gonneville's South Land and the perennially fresh descriptions of Quiros worked upon the mind of an able French naval officer, Lozier Bouvet or Bouvet des Loziers, and led him to appeal to the French East India Company to send out an expedition to discover and annex the Southern Continent. The Company after several years consented, desiring to establish a port of call for their ships trading to India and China, and Gonneville's South Land lying off the Cape of Good Hope with its fine climate and charming inhabitants would be very suitable indeed for this purpose. From Gonneville Land Bouvet proposed to take advantage of the prevailing westerly winds to reach Quiros's Australia del Espiritu Santo, where he hoped to open up a lucrative trade in slaves amongst other commodities, "and it is only by a great trade that a great navy can be supported." He proposed to return by Cape Horn and thus to accomplish a complete voyage of circumnavigation in the southern hemisphere in about two years' time.

The French East India Company gave two ships, the *Aigle* and the *Marie*, provisioned for eighteen months,

46 SIEGE OF THE SOUTH POLE

manned by a carefully selected crew and placed under the command of Bouvet and Hay. The instructions of the company stated that the object of the expedition was the discovery of southern lands which were to be sought for in latitude 44° S., and if not found the ships were to proceed as far as 55° S., afterwards returning to 44° S. and pursuing a sinuous track as far as 80° E. of Paris. While in sight of the southern land the ship's companies were to receive an increase of 25 per cent in their pay; but the captains were forbidden to bring any Australians (that is, inhabitants of the *Terra Australis Incognita*) to France.

Bouvet sailed from Lorient on July 19th, 1738, and by December 15th he commenced to meet floating ice in latitude $48^{\circ} 50'$ S., but no land was sighted where the maps showed the "Terre de Vue" five degrees farther north. Pushing on southward the expedition found the ice growing more abundant and the bergs larger, a good sign in Bouvet's opinion, for it argued the proximity of an elevated and extensive land, and, as he observed in his log "high lands are well known to be the healthiest." The weather was bad with much fog, but Bouvet was a good sailor and a determined man not likely to be baffled. At length on New Year's Day, 1739, his perseverance was rewarded by the discovery of a high snow-clad land thickly veiled in fog, but showing on its steeply scarp'd coast a prominent headland which was named, after the Church festival of the day, Cape Circumcision. It was impossible to make a landing and although the two vessels remained in sight of the cape for twelve days the fog never completely lifted and it could not be determined whether it was an island or part of a continent. The pilot of the *Marie* differed from his



Typical Antarctic Iceberg.
(Photograph supplied by Professor E. von Drygalski.)

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captain on this matter, believing that the evidence pointed to Cape Circumcision being on an island, and that not a large one. The position assigned by Bouvet was between $54^{\circ} 10'$ and $54^{\circ} 15'$ S., and between 27° and 28° East of Tenerife. Cape Circumcision will be heard of again several times in the course of our narrative.

On January 20th the Frenchmen reached $54^{\circ}40'$ S., close to the limit assigned by their instructions, and even had they wished to go farther they could not have done so on account of the ice-pack, the edge of which they followed for 400 leagues eastward along what they believed to be a continent rendered inaccessible by the floating ice. Bouvet accordingly turned north-eastward and continued the search for Gonneville Land to 55° E. (of Tenerife) with no result. His crews suffering much from illness he returned to France after a spirited and persevering effort to find what did not exist.

He did valuable work in freeing the South Atlantic of the mythical land and in bringing home the first fairly complete description of the huge flat-topped Antarctic icebergs amongst which he had sailed. Some of these he described as from 200 to 300 feet in height and from two to three leagues in circumference. The abundance of penguins and seals observed on the ice appeared to indicate the proximity of land for, as Bouvet observed, these are amphibious animals. And whether he was right as to the proximity of a coast-line or not he performed a solid piece of exploration in very hard conditions by sailing along 48° of longitude nearly in 55° S.

The contrast between the far south and the far north could not fail to strike the explorers, for here not long after the southern midsummer they found the sea filled with ice at a latitude corresponding to that of Belfast.

48 SIEGE OF THE SOUTH POLE

It began to be apparent that the approaches to the Antarctic circle were very effectively guarded.

The next incident in Antarctic history is the discovery by the Spanish merchant ship *Leon*, returning from Chile in 1756, of a high mountainous land covered with snow in 55° S., and far to the east of Cape Horn. This was named San Pedro after the saint of the day, and though the longitude assigned by the discoverer is wrong by ten degrees, there is no reason to doubt that it was the island now known as South Georgia.

The French natural philosophers of the middle of the eighteenth century, when passing in review the whole field of natural knowledge could not avoid so urgent a question as the nature of the unknown parts of the southern hemisphere. They did not lay stress on the popular idea that a great mass of land symmetrically arranged round the south pole was necessary to maintain the equilibrium and uniform rotation of the Earth; but they showed a general tendency to believe in some such continent. Thus the celebrated mathematician Maupertuis, in writing to his patron, Frederick the Great, pointed out the vastness of the unknown area which contains room enough for a fifth part of the world larger than any of the others, and considered it unreasonable to suppose that no land existed there. He pointed out also that signs of land had been observed by Bouvet all along the edge of the ice. These lands must form as it were a world apart which if they could only be reached would furnish "great opportunities for commerce and marvellous spectacles in Physics"; and he summed up by saying that he would rather have an hour's conversation with a native of the *Terra Australis Incognita* than with the finest intellect in Europe. Maupertuis was too good a man of

science not to be struck by the low latitude to which Antarctic ice penetrated northward, and he assigned as a reason for it the fact that the Antarctic summer occurred when the Earth was in the part of its elliptical orbit most remote from the sun and when its motion in the orbit is consequently slowest, so that the winter is not only colder, but eight days longer than that of the northern hemisphere. He also made the very practical remark that if Bouvet had had experience of the arctic regions and the methods of ice-navigation there he might have been more successful.

Buffon also dealt at some length with the unknown South in his essay on the Theory of the Earth where he expressed views as to the existence of a great continent which subsequent discoveries led him to modify. He seemed somewhat credulous in accepting the stories of "people worthy of belief" who had told him of an English captain named Monson who had reached 88° S. without seeing ice, and of some unnamed Dutchmen who claimed to have reached 89° S., or within 70 miles of the pole. One cannot help thinking of the Dutch sailor who boasted to his boon-companions in a sea-port tavern that he had once sailed so far north that he came two degrees beyond the pole, though we would not for a moment compare Buffon with the simple-minded pamphleteer who placed the vaunt on record as a fact.

Buache, the eminent geographer who will be remembered as the first to use contour lines on maps for expressing differences of level, read a paper to the Academy of Sciences in 1757 in which he suggested the existence of a great Antarctic Sea nearly surrounded by land, but with two openings whence vast quantities of ice from the rivers of that continent were discharged

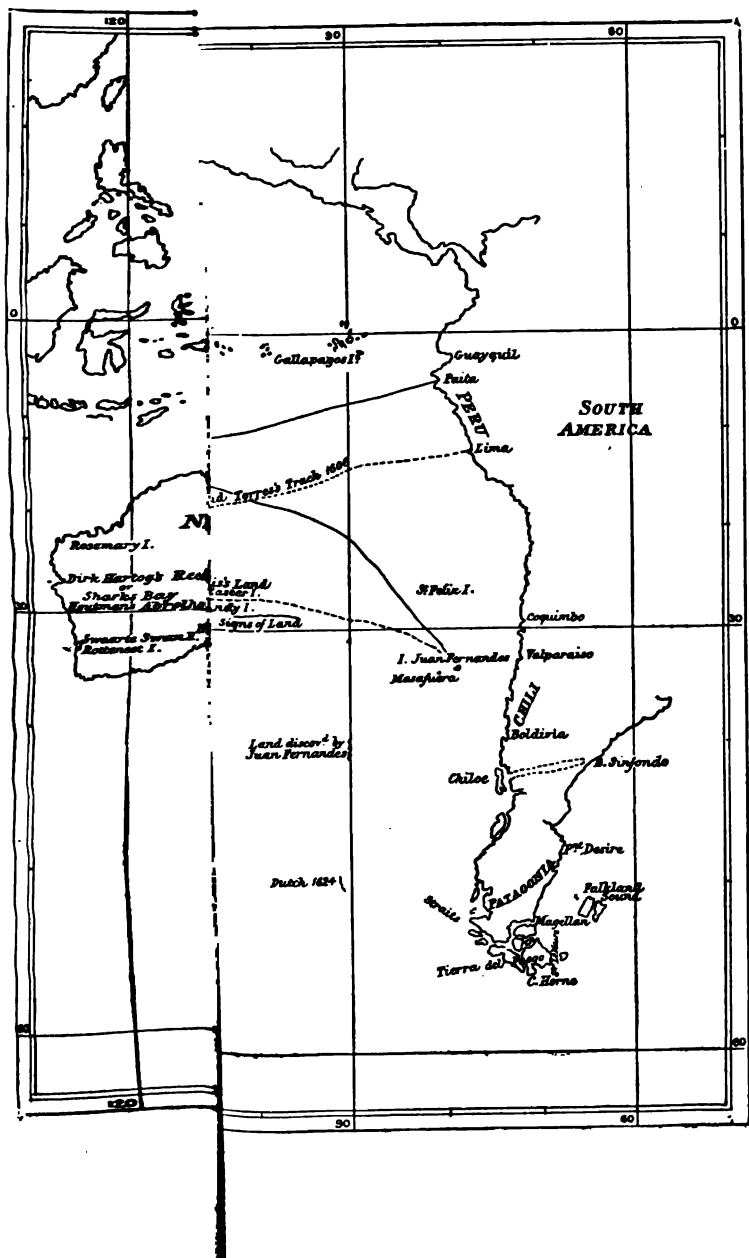
50 SIEGE OF THE SOUTH POLE

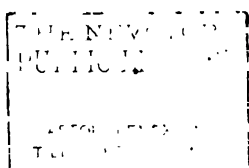
into the ocean, one south of Cape Circumcision, the other south of the mythical Davis Land.

Buffon performed a notable service to Antarctic research by inducing M. Charles de Brosses, president of the Parlement of Dijon to compile his "*Histoire des Navigations aux Terres Australes*," published in 1756. This work passed in review the details of all the voyages of exploration to the south so far as the records known at the time permitted, and the compiler strongly urged the continuance of voyages of discovery. "For a king this would be an enterprise more glorious than a war or a victory," he exclaimed. "Thank God," said King Edward VII. in bidding farewell to the expedition on board the *Discovery*, nearly a century and a half later, "this is no warlike expedition." De Brosses continued: "The most celebrated of modern sovereigns will be he who gives his name to the Southern World. This enterprise can only be carried out by a king or by a State; it is beyond the resources of an individual or of a company, for a company seeks before everything profit and immediate profit." He went on to point out that exploration ought to be carried out for its own sake; the resulting advantages would appear later.

De Brosses discussed the question of the southern ice, the difficulties which it presented, however, he believed would be found to diminish as one got further south, and he strongly upheld the existence of a habitable and colonisable continent in the unknown Southern Ocean.

The arguments of De Brosses, the tradition of De Gonneville's voyage, and the poetical narrations of Quiros did not fail to fire the ambition of French explorers, who were also stimulated by the very laudable desire to anticipate the discoveries likely to be made by the British





expeditions of circumnavigation which were about to be renewed under the command of Lieutenant Cook, R. N. Nor was it the French alone who believed in and desired to find the Southern Continent. When Byron started for his voyage of circumnavigation in 1764, and Wallis and Carteret two years later the British Admiralty instructed them to look for the land which "there was reason to believe might be found" in the South Atlantic and South Pacific. Byron and Carteret both searched in vain for the Davis Land of the charts and the great French explorer Bougainville shortly afterwards was naturally no more successful. The voyage of Carteret in particular was one of enormous difficulty on account of his being left by his colleague in a small and ill-found ship with insufficient stores and a scurvy-stricken crew, and no British captain ever 'acquitted himself with greater valour in his ~~command~~.

When, in 1772, Marion-Dufresne was sent out by the French government with two small vessels for the purpose of taking a young Tahitian who had been brought to France by Bougainville back to his home, he had instructions to visit the Southern Continent and New Zealand on the way. The former he failed to find though he lighted on some small islands between 46° and 47° S., now known as the Marion and Crozet Islands (Crozet being one of Marion's officers), but named at the time *Terre d'Esperance*, on account of the hope inspired that they lay off the coast of a continent.

Yves Joseph de Kerguelen-Tremarec was the last of the explorers to find anything which could even for a moment strengthen the illusion of a temperate Southern Continent. A noble of Brittany, he had long cherished the hope of visiting the fair south land of his fancy and

52 SIEGE OF THE SOUTH POLE

undertaking a voyage of discovery in the vast seas which surround the south pole. His representations at Court were favourably received and he sailed from Lorient on May 1st, 1771, furnished with very precise instructions for his guidance. He was ordered to sail southward from the Ile de France (Mauritius) in search of "a very large continent to the south of the islands of St. Paul and Amsterdam," which was probably that reached by the Sieur de Gonville who stayed there for six months in the year 1504. If the Sieur de Kerguelen was fortunate enough to find the continent he was to seek a harbour, land and enter into commercial relations with the inhabitants. Since France had lost her splendid colony in Canada the colonial party were extremely anxious to find some new sphere for territorial expansion and, curiously oblivious of the empty expanse of Africa, they looked towards the south temperate zone, even making an attempt to colonise the Falklands, which was relinquished on account of claims to those islands preferred by Spain.

On January 16th, 1772, Kerguelen left the Ile de France bound south with two ships, the *Fortune* under his own command, and a small vessel, the *Gros Ventre*, under the command of the Count de St.-Allouarne, confident of soon reaching Gonville Land. On February 12th a small island was sighted and the next day a more extensive land appeared. A storm separated the ships and Kerguelen was prevented from landing, but the Count de St.-Allouarne went ashore in "Sea-lion Bay" in 49° 40' S., and took possession of la France Australe. Bad weather and constant fogs made a longer stay in the neighbourhood dangerous, and being anxious to bring home the news of his success, Kerguelen returned to

France. He returned with a very highly coloured description of his discovery, including these statements:

"The lands which I have had the happiness to discover appear to form the central mass of the Antarctic continent, . . . and the land which I have called South France is so situated as to command the route to India, the Moluccas, China and the South Seas. . . . South France can henceforth give new life to the *Ile de France* and Bourbon, tripling their sea-trade, provisioning and enriching them. . . . The latitude in which it lies promises all the crops of the Mother Country from which the islands are too remote to derive fresh supplies. . . . No doubt wood, minerals, diamonds, rubies, precious stones and marble will be found. . . . If men of a different species are not discovered at least there will be people in a state of nature living in their primitive manner, ignorant alike of offense or remorse, knowing nothing of the artifices of civilised society. In short South France will furnish marvellous physical and moral spectacles."

It seems that Kerguelen failed altogether to convince his compatriots; some were critical, others laughed at the whole story as a tissue of lies; but notwithstanding the incredible assertions he had made two new ships were provided for him and he started on March 26th, 1773, for a new voyage. This time his instructions were to return to the southern lands, to establish a post in a suitable place, and then to sail eastward between the parallels of 40° and 60° S., coasting the Southern Continent and landing wherever it appeared that useful observations could be made.

Kerguelen reached the *Ile de France* with his ships disabled and many of his crew seriously ill. His officers

54 SIEGE OF THE SOUTH POLE

were not equal to their work, and when he sailed for South France in bad weather all the conditions of the expedition were about as unfavourable as they could be. He reached the land, went ashore at midsummer (December, 1773), and found the weather cold, with constant fogs and gales, the land sterile and uninviting. It was impossible to leave a party on shore, impossible in the enfeebled state of the ships' companies to pursue further exploration, and there was no alternative but to return to France. The leader had truly predicted that South France would furnish marvellous physical and moral spectacles, though he little thought that they would be manifested in his own body and mind. The disillusion was complete. Kerguelen changed the name of South France to the Land of Desolation, and he declared that he would rather live in Iceland under the polar circle than in the land of his own discovery in a latitude corresponding to that of Paris. He recognised even that it was not part of a continent, for Cook had meanwhile passed round the world through the open sea far to the southward.

One cannot but feel sympathy for this man of fine enthusiasm, an enthusiasm which certainly let his imagination dominate his reason when at home, but which was equally the motive of two long and hazardous voyages full of hardships and beset with difficulties of every kind. Kerguelen's narrative gave displeasure to those in authority and is said to have been suppressed. It is but right that the desolate island should be known for all time as Kerguelen Land, and some small posthumous honour may accrue to its discoverer from the valuable scientific observations for which it has been from time to time the base.

The last episode in the search for the great South Land

was the beginning of real Antarctic exploration and its importance requires the space of a separate chapter. The period of vague conjecture as to landfalls, and guessing at longitudes had come to an end. At last nautical instruments were perfected by the universal adoption of the quadrant or sextant, and above all by the invention of the chronometer. Scientific views were at last able to assert themselves even in the presence of political controversies at home and wars abroad, and the greatest of British maritime explorers, the one man who could be compared with Columbus and Magellan had appeared in the person of James Cook.

CHAPTER IV.

THE ACHIEVEMENT OF JAMES COOK

"My will is backed with Resolution;
Thoughts are but dreams till their effects be tried."

—SHAKESPEARE

IN the middle of the eighteenth century, as we have seen, the southern hemisphere figured upon all maps as the seat of a great continent awaiting discovery. The tenacity of the hold of this continent on the minds of geographers is somewhat remarkable and probably no prepossession based on such inadequate data ever died a harder death. It is true that a good deal of fun had been made throughout the centuries of this idea of a southern continent. Bishop Hall of Exeter in 1604 had written a book with a title too long to quote, commencing "*Mundus alter et idem, sive Terra Australis antehac semper incognita*," in which he satirised the vices of Europe in an imaginary southern continent, giving, it is said, the idea to Swift of *Gulliver's Travels*. Other authors, Dutch, French, and Italian at various times enlivened literature with imaginary visits to the South Land, in which, however, they rarely outdid the fervid descriptions of Quiros.

The last of the firm believers in the southern continent was the fiery tempered and indefatigable controversialist Alexander Dalrymple, a figure not without interest in this history, though the part he played was

too often ungracious and ill-natured. He united the most passionate enthusiasm for exploration with the bitterest contempt for contemporary explorers who were doing what he would fain himself be asked to attempt; and he expressed his views without reserve in a torrent of language which can only be described by quotation.

Alexander Dalrymple, son of Sir James Dalrymple and brother of Lord Hailes, entered the East India Company's service at fifteen and nearly spoilt his career at the outset by his bad penmanship. Eventually he overcame all difficulties, travelled in the Malay archipelago, and at twenty-five commanded a ship in eastern waters. He became acquainted with the early Spanish voyages in the Pacific and collected a mass of information on the subject. He had studied the formation of coral islands and wrote a paper on that subject for the Royal Society, of which he became a Fellow at an early age, and he was well versed in astronomy.

The Royal Society was desirous of obtaining careful observations of the transit of Venus across the disc of the sun which it was known would occur in 1769, and be visible in the southern hemisphere. Although the planet Venus circulates within the orbit of the Earth it is extremely seldom that both planets lie in the same plane with the sun when they pass each other, so as to allow the inner planet to be seen from any part of the Earth as a black spot crossing the sun's disc. The observation of the solar parallax from which the distance of the sun from the Earth is calculated can best be made during a transit, hence the value to astronomers of this phenomenon. The Royal Society in 1766 made representations to the Treasury and to the Admiralty, and the

58 SIEGE OF THE SOUTH POLE

Government agreed to send out an expedition, giving instructions to Captain Wallis, then about to start on his circumnavigation, to look out for a suitable place for the observations. Mr. Dalrymple took a great interest in preparing the plans, selecting the vessels, if we interpret one of his statements correctly, and drawing up draft instructions. He published in 1767 a short *résumé* of the Spanish voyages in the Pacific in order to direct public attention to the great continent awaiting discovery, and made himself so thoroughly master of the whole subject that the Royal Society nominated him for the leadership of the astronomical expedition.

It would be tedious to trace the steps of an old grievance, but it appears that Dalrymple expected the command of the ship as well as of the expedition, and to be given the commission of Captain in the Royal Navy like Halley seventy years before. But the precedent of Halley's voyage was not forgotten at the Admiralty, and mindful of the troubles that arose from the thrusting of a naval officer's duties upon a man of science the First Lord, Sir Edward Hawke, swore roundly that he would rather cut off his right hand than sign a commission for anyone to command a king's ship who was not a naval officer. Dalrymple would go in no other capacity. Sir Hugh Palliser thereupon strongly recommended that the appointment should be given to James Cook, a Master in the Royal Navy, who had seen much service as a surveying officer on the North American coast and was fitted to undertake the scientific leadership as well as the naval command. Dalrymple became Cook's enemy and critic from that time. After the return of the expedition and the publication of its results he wrote:



Darvynple

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"I am very far from intending the most distant insinuation of resentment to, or dissatisfaction with, the worthy and brave old Officer who was at the head of the Admiralty when the Endeavour was purchased; his ideas on the subject of discovery were clear and just in the only conference I ever had with him, and I have been told that afterwards, 'He lamented I *did not go*'; but his open, honest, unsuspecting nature, I think, exposed him to the insinuations of *cunning* men, who would have endeavoured to throw the *odium on me* if the expedition, in the mode it was proposed, *had not been successful*, and attributed *all the merits* to their own tools. The point is not yet determined *whether there is or is not a SOUTHERN CONTINENT?* Although four voyages have been made *under their auspices*, at the same time I dare appeal, even to them, that I would *not have come back in Ignorance.*"

Cook accepted the appointment with the calmness of a man who knows his own powers. He had climbed from the very lowest rung of the ladder of sea service. The son of a Northumbrian or Roxburghshire father and a Yorkshire mother, he inherited no other advantage than that of the sturdy character and the undemonstrative temperament of the borders, for his father was only a farm labourer and he himself ran away to sea from an uncor genial apprenticeship. From boy on a collier he worked his way up to be mate; then, to anticipate the press-gang, he volunteered for the Royal Navy as an able seaman and was promoted Master for his services in sounding the St. Lawrence under fire at the siege of Quebec, and in the survey of the Newfoundland coast. Self-made if ever a man was, entirely self-educated, he forced himself to the front by pure merit and tenacity in

60 SIEGE OF THE SOUTH POLE

an age when merit was by no means the usual road to promotion.

Cook received the rank of Lieutenant and sailed in 1768 with orders to proceed to King George III. Island or Otaheite, recently discovered by Wallis—at this time no one knew that it had previously been known to Quiros—and after observing the transit of Venus there on June 1st, 1769, to sail southward for exploration. He circumnavigated and surveyed New Zealand, proving that it was no part of any Antarctic continent, charted the east coast of New Holland and sailed through the strait between it and New Guinea, a strait, as Dalrymple pointed out with vindictive pleasure, which had previously been discovered by Torres.

During Cook's absence Dalrymple had completed and published his valuable "Historical Collection of the Several Voyages and Discoveries in the South Pacific Ocean," which first gave prominence to the work of Quiros and his successors. The dedication of the volume was so characteristic that it is worth reproducing in its entirety.

Not—to Him
Who discovered *scarcely* any thing
But—Patagonians;
Nor—to Him
Who, from 20° South Latitude,
Determined
To come—Home
Into 50° North,
Thinking it *impossible*
To go—into 30° South,
On Discovery;

Nor—to Him
Who left the arms of a Calypso,
To amuse
The European World
With stories of *enchantments*
In the New-Cytherea
Mistaking the example of Ulysses,
Who never *wished*
To return Home,
Till he had atchieved *that*
For which he went Abroad.
But to
The man
Who,
Emulous of Magalhanes,
And
The Heroes of former Times,
Shall *persist* through *every* Obstacle,
And
Succeed not by Chance,
But
By Virtue and Good-conduct
This Historical Collection
Of Former Discoveries
In
The South Pacific Ocean
Is Presented
By
Alexander Dalrymple.

May 14, 1769.

The ungenerous reflections on a former explorer, apparently Bougainville, contained in this dedication, cannot apply to Cook, the results of whose voyage were

62 SIEGE OF THE SOUTH POLE

still unknown; but the description of the ideal man of action to whom the work is presented agrees, however reluctant the author might be to admit it, with no one in all the range of history so well as with Cook himself.

On Cook's return all the logs and other documents of the expedition were handed over to a ponderous man of letters, Dr. Hawkesworth, to be put into literary form by him and combined in one work with the narratives of the circumnavigations of Byron, Wallis, and Carteret. They were accordingly clothed with a wealth of classical imagery and interspersed with trite moral reflections in a manner adapted to the taste of the period, and the plain tale of Cook's own log was actually left unpublished for one hundred and thirty years, while, incredible as it may seem, the description of some of the scientific collections of the voyage with the plates engraved at the time are only now appearing in the twentieth century. Despite its defects no book ever became more popular at once and for all time and in all languages than Cook's First Voyage, and we find Robert Burns in 1785 speaking of "some unkenned o' isle beside New Holland," as a simile that would be familiar to his peasant neighbours in Ayrshire.

Dalrymple now formed the resolve to undertake the search for the southern continent. He proposed to associate some of his friends with himself and to bear the expense jointly, but he first applied to the Government for a concession of all unoccupied lands he might find in the course of five years between the equator and 60° S. Two letters on this subject written in 1772 to Lord North were never answered, the concession was not granted, the expedition did not sail. What sort of inducements Dalrymple held out may be understood from

the following extract obviously based on the epistle of Arias which he had discovered and translated as an important document.

"The American colonies are generally supposed to contain two millions of people, whose commerce with Britain is thought to give them an over-ruling influence. The number of inhabitants in the Southern Continent is probably more than 50 millions, considering the extent, from the eastern part discovered by Juan Fernandez, to the western coast seen by Tasman, is about 100 deg. of longitude, which in the latitude of 40 deg. amounts to 4596 geographic, or 5323 statute miles. This is a greater extent than the whole civilised part of Asia, from Turkey to the eastern extremity of China. There is at present no trade from Europe thither, though the scraps from this table would be sufficient to maintain the power, dominion, and sovereignty of Britain, by employing all its manufacturers and ships."

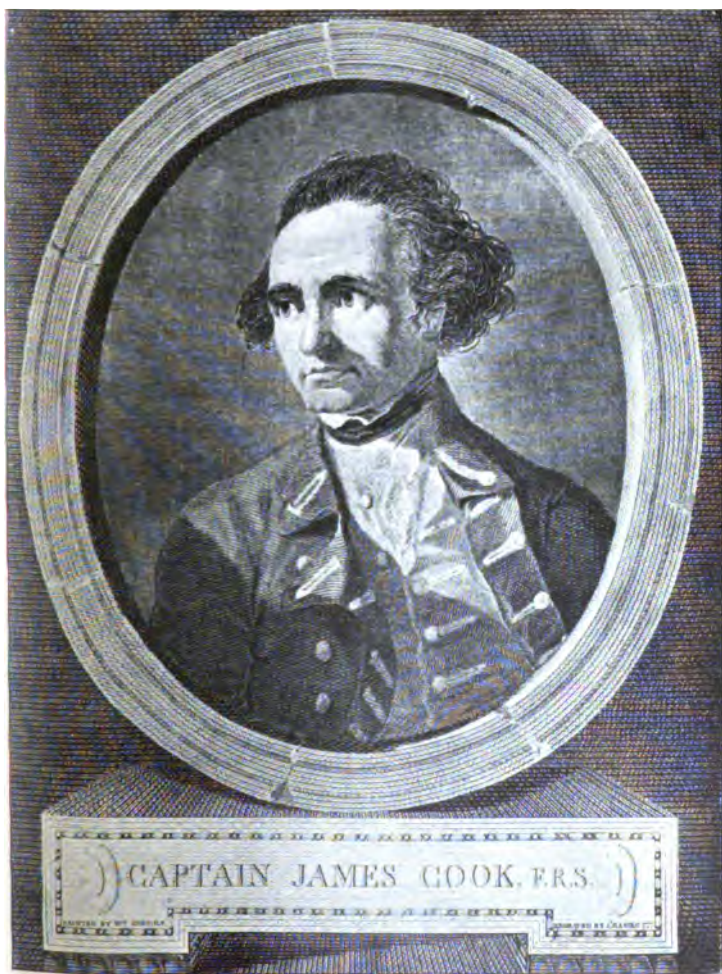
Hawkesworth's account of Cook's First Voyage was published in three quarto volumes in 1773, and Dalrymple not caring to attack Cook directly, immediately fell upon the conscientious though infelicitous editor with a letter "occasioned by some groundless and illiberal imputations" made in the work. Hawkesworth replied in the preface to the second edition, and Dalrymple responded with a force and vivacity that may be appreciated from an extract:

"Altho' I believe in *Providence*, I am not a *Roman Catholic* to give my confidence into the keeping of Dr. Hawkesworth, or any other Doctor; nor do I think myself bound to *avoid every man* whose conduct and behaviour, in *certain instances*, I condemn: altho' the death of an *Indian unnecessarily* may appear to me *murder*,

64 SIEGE OF THE SOUTH POLE

it may not seem so to *him*, and therefore altho' I think the *act*, murder, I cannot deem *him*, absolutely, a *murderer*; or perhaps he may have *repented*; at the same time, if I thought I could obtain any information useful to the Public by associating with the Devil or Dr. Hawkesworth, I should have no *scruples of conscience* to be in their company, tho' the one could not induce me *wantonly* to destroy my fellow-creatures, nor the other, by all his erudition and elocution, convince or persuade me that 'in little more than seven years, *Discoveries* have been made *far greater* than those of *all the navigators* of the *world collectively*, from the *expedition* of Columbus to the present time.'"

While this unedifying strife was in progress the Admiralty had taken a shorter way to settle the question in dispute. Cook, whose only official reward had been the simple promotion to Commander, received at least "the glory of going on." He was appointed to command a new expedition intended to solve the problem of the Southern Continent finally, and he had scarcely wound up the affairs of his first voyage before he was deep in the preparations for the second. These preparations were of no ordinary kind. He had to procure ships, and arrange for their stores and provisioning. The latter was a matter to which he gave the minutest personal attention. In his previous voyage he had made successful experiments in the prevention of scurvy which in all earlier voyages of circumnavigation had played havoc with the crew. He determined to get rid of this bug-bear to exploration, and accordingly laid in quantities of preserved vegetables, mostly in the form of pickles and "sour krout," as well as malt and various extracts of herbs. The necessity of cleanliness was also present



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with him and the regulations he made for the conduct of his crew in this particular were very like those in force at the present day, though a startling innovation in a naval ship of 1772. As to the vessels, Cook stated his requirements in these words:

“A ship of this kind must not be of a great draught of water, yet of a sufficient burden and capacity to carry a proper quantity of provisions and necessaries for her complement of men, and for the term requisite to perform the voyage. She must also be of a construction that will bear to take the ground, and of a size which, in case of necessity, may be safely and conveniently laid on shore to repair any accidental damage or defect. These properties are not to be found in ships of war of forty guns, nor in frigates, nor in East India Company's ships, nor in large three-decked West India ships, nor indeed in any other but North-country-built ships as such are built for the coal trade, which are peculiarly adapted for this purpose.”

Commander Cook on this expedition had two vessels, both ship-rigged and of the stout north-country collier type, built at Whitby and nearly new—the *Resolution*, of 462 tons and 112 men under his own command, the *Adventure*, of 336 tons and 81 men, under that of Lieutenant Tobias Furneaux, who had been Wallis's second lieutenant. The appointments were dated on 28th November, 1771. The Admiralty instructions were dated June 25th, 1772. Lord Sandwich, who was at that time First Lord, took the deepest personal interest in the expedition, visiting the ships again and again during their equipment, and coming on board in Plymouth Sound just before the expedition sailed, to assure himself that everything had been done to Cook's satisfaction.

66 SIEGE OF THE SOUTH POLE

The object of the voyage was to discover the great Southern Continent if it existed or to disprove its existence definitely. The plan was in fact similar to that of Kerguelen's second voyage, different as was the result. Cook was instructed to proceed to Madeira, thence to the Cape of Good Hope, then a Dutch possession, for it must be remembered that at that date there was no British territory in the Southern hemisphere and that Cape Town, the river Plate, Valparaiso and Batavia were the nearest ports to the Antarctic circle where a ship could refit. From the Cape he was to proceed southward in search of Bouvet's Cape Circumcision in 54° S., $11^{\circ} 20'$ E., and if it were discovered to determine if it were part of a continent. In case it should be so he was to explore as much of the continent as possible, to land and make such "observations of every kind as might be useful either to navigation or commerce, or tend to the promotion of natural knowledge." His attitude towards the inhabitants, if any, was laid down carefully and he was enjoined to invite them to trade and show them "every kind of civility and regard." The continent was to be coasted either eastward or westward and the exploration continued as near to the South Pole as possible so long as the state of the vessels and the health of the crew permitted, and a sufficiency of provisions was in hand to enable the ships to reach a port of supply. Should Cape Circumcision be found to be on an island it was to be surveyed, and in this case, or if Bouvet's reported land could not be found, Cook was instructed to proceed southward as long as he considered that there was any likelihood of falling in with the continent and then to proceed eastward in a high latitude until he had circumnavigated the globe, making such discoveries as might be as near the pole as

possible. This being done the ships were to proceed to the Cape of Good Hope and return thence to Spithead. When the season of the year made it unsafe to remain in high latitudes the ships were to retire to some known place to the northward to refit and refresh the people, after which they were to return to the south. In all cases not provided for in the Instructions Cook was to exercise his own discretion.

The vessels were provisioned for two years, salted beef and pork being of course the only meat possible; but the various preserved vegetables, soups, sugar and extracts promised better fare than Jack usually received in the eighteenth century. The ships were armed, the *Resolution* carrying twelve guns, for it was war time. In addition to the usual boats the timbers for a cutter of twenty tons were put on board each in case of shipwreck on an unknown coast. A considerable number of live-stock was carried for food and for setting free on suitable islands. The voyage was intended to be largely devoted to scientific research. An astronomer accompanied each ship. Mr. William Wales on the *Resolution*, Mr. William Bayley on the *Adventure*. Mr. William Hodges, an artist, was taken to depict the places and people met with.

The first exploring voyage of Captain Cook had been made famous for scientific discoveries by the voluntary services of Mr. Joseph Banks and Dr. Solander. Banks was anxious to go again and in order to accommodate him and his scientific equipment a poop had been fitted to the *Endeavour*, which, however, overweighted the ship and had to be removed. Other difficulties arose and to the great disappointment of both Banks and Cook the former was unable to go, although he had spent some thou-

68 SIEGE OF THE SOUTH POLE

sands of pounds in preparation.* It was held to be of public utility that some person skilled in Natural History should accompany the expedition and, as Cook drily observes in his preface, "Mr. John Reinhold Forster with his son were pitched upon for this employment." The choice turned out to be an unhappy one, but it proved valuable in a quite unexpected way, as the eloquent expression the disappointed naturalists gave to their grievances supplies all the touches of human interest that are lacking in Cook's impassive chronicle. The equipment of scientific instruments was slender; setting aside those for astronomical work and the ordinary duty of navigation we find mention made only of an azimuth compass, a dipping needle, a marine barometer and two portable barometers, a wind-gauge, six thermometers, a theodolite, level and chain and an apparatus for taking the temperature of the sea at various depths. There were chronometers of several patterns, the use of which for determining longitude was then in an experimental stage, and these proved invaluable.

The expedition left the Thames on June 22nd, and sailed from Plymouth on July 13th, 1772. Madeira was reached on the 29th, and after a stay of three days the voyage was resumed, Cape Town being reached on October 30th. At Cape Town Cook was courteously received by the Dutch governor, who informed him of the results of the voyages of Kerguelen and of Marion and Crozet, and showed a chart of their discoveries. Here also he met Andrew Sparrmann, a Swedish naturalist, one of the

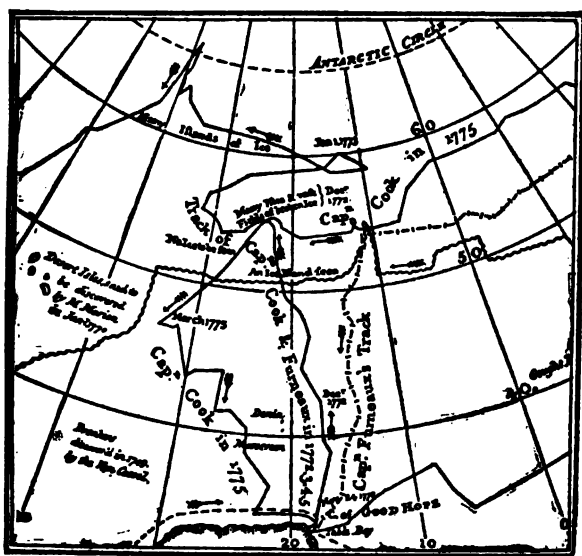
* When Sir Joseph Hooker went to India in 1847 he was presented with a number of large glass jars for preserving plants in spirits that had been part of Banks's equipment for Cook's second voyage.

many pupils of Linneus who were engaged in studying natural phenomena in all parts of the globe. Dr. Reinhold Forster was much attracted by the young Swede and felt that he would be a most valuable assistant in making scientific observations. Spärrmann was eager to extend the sphere of his researches and after much importunity Cook consented to take him on board, Forster paying for his food and allowing him a salary at his own expense.

The expedition left Cape Town on November 22nd, 1772, steering in the direction of Bouvet's Cape Circumcision. On December 10th, in $50^{\circ} 40'$ S. and 20° E., the first ice was met with, a majestic berg perpendicular in the sides, flat on the top, a veritable island of ice. Next day the bergs had increased in number, the sea ran high, a fierce storm was blowing and thick fog lay over everything. On the 11th Cook crossed the assigned latitude of Cape Circumcision at a point ten degrees east of Bouvet's longitude. All eyes were on the outlook for the expected land, and again and again the wreaths of sea-fog lightened and the edge of some huge berg appeared, to be mistaken for land for a few moments and then recognised as a drifting island of ice. Yet some of the officers held to the belief that land had been sighted until on the return voyage two years later the Resolution crossed the reported situation of Bouvet Island in clear weather and saw nothing. Cook, thanks to his chronometers, was able to keep a good account of longitude as well as latitude. As he pursued his way southward he had also to work eastward along the edge of a field of heavy floating ice; but rounding that obstruction in 57° S. he turned to the W. S. W. until he crossed the meridian of 10° E. in latitude 59° S. He now had passed 300 miles to the south of Bouvet's position for

70 SIEGE OF THE SOUTH POLE

Cape Circumcision, and as the weather was absolutely clear so that high land could be seen 70 miles away Cook was justified in assuming that Cape Circumcision was not a part of a continent. Moreover the ice was drifting freely to the north which it could not well do if a continent were there to block the way. Taking these facts into consideration Cook came to the con-



COOK'S TRACKS NEAR BOUVET ISLAND.

clusion that Bouvet had mistaken a great iceberg for land. This is perhaps evidence that Cook did not know Bouvet's own report of his work, for it is difficult to see how any sailor could keep in sight of an iceberg for twelve days without detecting its nature.

On January 2nd, 1773, the ships were once more turned

to the southeast in conformity with the Instructions. Several cases of scurvy occurred and were checked by the use of sweet worts. Christmas had been celebrated by the crew, who had been saving up their daily ration of spirits for weeks before, "with savage noise and drunkenness," to quote the words of the younger Forster. No doubt some of the noise was due to the performance of a Highlander amongst the crew who had brought his bagpipes to rouse the echoes of the bergs, and who afterwards played a considerable part in charming the shy natives of the tropical islands with the music of the north.

The Forsters seem to have been but little suited for the life of exploring naturalists. Their cabins were the worst on board, they declared, and the bedding never dry; the misery of the monotonous days impressed them deeply. "We were almost perpetually wrapped in thick fogs," they lamented, "beaten with showers of rain, sleet, hail, and snow, surrounded by innumerable islands of ice, against which we daily ran the risk of being shipwrecked, and forced to live upon salt provisions, which concurred with the cold and wet to infect the mass of our blood."

January 17th, 1773, was an epoch in the world's history, for just before noon on that day the Antarctic circle was first crossed by human beings. The southern frigid zone foreseen by Aristotle, reasoned on by the Greek philosophers, who declared it existent but inaccessible, denied and stigmatised as heretical by the mediæval Church, never hitherto deliberately sought for, had at last been entered by the Resolution and Adventure in an open sea with only one iceberg in sight. Cook had now outdistanced all his predecessors; but the attempt to push

72 SIEGE OF THE SOUTH POLE

southward was made impossible by the increasing thickness of the crowd of bergs and at 6 p. m. on the same day a vast expanse of solid ice appeared, rising only about eighteen feet above the sea but stretching with a perfectly uniform surface, as far as the eye could reach from the top of the mast. It was the signal for retreat. The season was too far advanced to try to turn the edge of this barrier and to the joy of all on board except the captain the Resolution's head was turned northward in latitude $67^{\circ} 15' S.$ and $39^{\circ} 35' E.$ due south of the Mozambique Channel. The supply of fresh water had given out some time before, but Cook was aware of some previous researches on sea-ice and to the disgust of his sailors who expected an earlier refuge in some "New Cytherea" of the tropics, he ordered out the boats and filled his barrels with blocks hewn from the nearest mass of floating ice.

At the end of January the Resolution was cruising in $49^{\circ} N., 59^{\circ} E.$ looking for the lands discovered by the French expeditions of the previous year of which Cook had heard at Cape Town. It is curious that he was exactly in the latitude of Kerguelen Land, but 10° too far east, being in fact midway between that island and the Crozets, and accordingly he saw nothing of either. The two ships parted company in a gale on February 8th, and as a portion of the summer still remained, Cook bore southeast once more, and fell in with icebergs in the middle of February in $57^{\circ} S.$ On February 24th he was in $61^{\circ} 52' S.$ and $95^{\circ} E.,$ and once more fields of ice blocked the way. Again and again the appearance of penguins and other birds seemed to indicate the vicinity of land, but Cook did not lay much stress on this prognostic and was convinced that far from being the north-



The Ice Islands of the Antarctic.
(From Cook's "Second Voyage.")

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ern capes of a continent the French discoveries were only insignificant islands. Baffled in the attempt to get farther south, Cook kept an easterly course, a little to the south or a little to the north of the parallel of 60° as the ice permitted or required, until he reached the meridian of 147° E. on March 16th. It was now time to seek lower latitudes but not yet time for rest. The *Resolution* tried to make the east side of Van Diemen's Land, where Cook wished to ascertain if the coast were continuous with that of New South Wales; but the westerly winds were too strong, so he bore up for New Zealand, which was reached in Dusky Bay on March 26th, after 122 days at sea. The *Adventure* was found in Queen Charlotte Sound, now known as Cook Strait. She had made a straight course without discovering any land. Between the routes of Tasman, Marion, Kerguelen, Cook, and Furneaux there was no room for a temperate continent in the Southern Ocean; the voyage of the *Resolution* had swept one-third of the great circumpolar continent within the ice-barrier south of 60° S.; and implanted in Cook a lively distrust in the existence of the other segments.

Until June 7th Cook employed himself in surveying the coast of New Zealand. The naturalists landed, made collections and had various adventures with the natives, after an interview with whom on one occasion the worthy Sparrmann stalked forth from the bush wearing only his spectacles, all the rest had been involuntarily sacrificed to the inquisitiveness and acquisitiveness of the Maoris.

From New Zealand both ships pursued their researches for three months between 41° S. and 46° S., to the eastward as far as 135° W., nearly half way across the Pacific. Many on board expected daily to fall in

74 SIEGE OF THE SOUTH POLE

with the visionary continent of Quiros and Dalrymple, but no land of any kind was sighted.

Toward the end of August the two ships cast anchor in Matavai Bay, in the sailor's paradise Tahiti, and there the life for a few brief weeks would have justified the sternest moral censure of Dalrymple. The men had worked hard and endured much, and sailors have always had large license in the manner of their "refreshment." Forster, with his usual spitefulness, observed that the scenes of debauchery on board the ships at Tahiti almost made him believe they were in Spithead. This brief interlude over, the stern discipline which Cook always exercised when at sea was again imposed and the ships returned toward New Zealand. The Adventure was lost sight of and not seen again until the return to England, but the Resolution arrived at Queen Charlotte Sound on November 3d, 1773, and after catching and salting a quantity of fish, and gathering every green thing which by any possibility could be eaten to keep away scurvy they sailed for the frozen seas on the 26th.

The 60th parallel was crossed in 177° W., whence a course was held to the southeast and the first ice met with on December 12th in $62^{\circ} 10'$ S., and 172° W., much farther south than was the case a year earlier to the south of the Cape of Good Hope. The ice, once met with, soon increased in quantity and on the 15th it was necessary to turn northward, but on the 20th the Antarctic circle was reached in $147^{\circ} 30'$ W., and for three days the Resolution pushed her way eastward within the circle, reaching the farthest latitude of $67^{\circ} 31'$ S. on December 22nd. On the 23rd it was found necessary on account of the exhaustion of the officers and men and the continued bad weather to stand northward again in 135° W., after mak-

ing twelve and a half degrees of easting south of the circle. The ship reached $47^{\circ} 50'$ S. in 123° W., a useful detour, since it showed that no continuous land stretched between New Zealand and Cape Horn, but affording little rest to the jaded crew, who on January 18th were once more on the poleward side of 60° , bound south. On January 20th icebergs appeared, one of them towering to a height of 200 feet, with a dome-shaped peak, but as the ship got farther south the number of bergs diminished and the air grew warmer.

When the Resolution crossed the circle for the third time in $109^{\circ} 31'$ W. on January 26th, 1774, no ice was in sight; but floes appeared next day and a thick fog came on, greatly hampering navigation. Every one on board was suffering more or less from the salt food and the miserable weather. George Forster we are sure did not exaggerate when he said, "A gloomy, melancholy air loured on the brows of our shipmates, and a dreadful silence reigned amongst us. . . . The hour of dinner was hateful to us." The captain alone, he said, seemed to grow better as they advanced toward the pole. On January 30th, 1774, the weather was clear and the ship was blocked in $71^{\circ} 10'$ S. and $106^{\circ} 54'$ W. It was the farthest south of the cruise and of the century. The situation is thus described by Captain Cook himself:

"On the 30th, at four o'clock in the morning, we perceived the clouds, over the horizon to the south, to be of an unusual snow-white brightness, which we knew announced our approach to field ice. Soon after it was seen from the topmasthead, and at eight o'clock we were close to its edge. It extended east and west far beyond the reach of our sight. In the situation we were in, just the southern half of our horizon was illuminated by the

76 SIEGE OF THE SOUTH POLE

rays of light reflected from the ice to a considerable height. Ninety-seven ice hills were distinctly seen within the field, besides those on the outside—many of them very large, and looking like a ridge of mountains rising one above another till they were lost in the clouds. The outer or northern edge of this immense field was composed of loose or broken ice close packed together, so that it was not possible for anything to enter it. This was about a mile broad, within which was solid ice in one continued compact body. It was rather low and flat (except the hills), but seemed to increase in height as you traced it to the south, in which direction it extended beyond our sight. Such mountains of ice as these, I think, were never seen in the Greenland seas, at least not that I ever heard or read of, so that we cannot draw a comparison between the ice here and there. It must be allowed that these prodigious ice mountains must add such additional weight to the ice fields which enclose them as cannot but make a great difference between the navigating this icy sea and that of Greenland.

“I will not say that it was impossible anywhere to get farther to the south; but attempting it would have been a dangerous and rash enterprise, and which, I believe, no man in my situation would have thought of. It was, indeed, my opinion, as well as the opinion of most on board, that this ice extended quite to the pole, or perhaps joined on some land to which it had been fixed from the earliest time, and that it is here, that is, to the south of this parallel, where all the ice we find scattered up and down to the north is first formed, and afterwards broken off by gales of wind or other causes and brought to the north by the currents, which are always found to set in that direction in high latitudes. As we drew near this

ice some penguins were heard but none seen ; and but few other birds, or anything that could induce us to think any land was near. And yet I think that there must be some to the south behind this ice ; but if there is, it can afford no better retreat for birds or any other animals than the ice itself, with which it must be wholly covered. I, who had ambition not only to go farther than anyone had been before, but as far as it was possible for man to go, was not sorry at meeting with this interruption, as it in some measure relieved us, at least shortened the dangers and hardships inseparable from the navigation of the southern polar regions. Since, therefore, we could not proceed one inch farther to the south, no other reason need be assigned for my tacking and standing back to the north."

Another reason may be suspected, however, for even the iron constitution of Cook could not resist a diet of old and over-salted meat and rotten biscuits half-devoured by cockroaches, combined with the constant exposure and anxiety of navigating a ship in such seas. The horrors of extreme cold and of darkness were fortunately spared these first "intruding mortals," to use Forster's phrase, but the monotony of nearly perpetual daylight is in itself hard to bear and the constant neighbourhood of the freezing point makes a miserable mid-summer, when there is no dry place in the ship. The ship had not gone far on her northward voyage before the captain broke down ; "a bilious colic," he called it, but apparently it very nearly proved fatal, both to himself and to the ship's surgeon, who tended him by day and night without intermission until the crisis was passed. Illness, whether of his crew or of himself, never stopped the work of James Cook when he could think or the men

78 SIEGE OF THE SOUTH POLE

could move, and it must be remembered that the worst effects of scurvy were still kept at bay and there were no deaths.

The Resolution sailed north between 100° and 90° W., looking for Juan Fernandez land, the report of which had been made known by Dalrymple's translation of the long forgotten letter of Arias, but no such land had been found when on February 21st, Cook reached the position assigned to its northern coast, $37^{\circ} 54'$ S. and 90° W., and after several days satisfied himself that if there was land at all, it could only be a small island, as there was room for nothing of any great size between his track and those of the other circumnavigators. Having disposed of the Spanish myth, he turned westward to prove that the only kernel of truth in the great expanse of Davis Land as shown on Dalrymple's chart was the quaint little Easter Island. The island was found none too soon to replenish the supply of food, and its marvellous statues and terraces so unlike the work of any known Polynesian race formed a welcome object of study and description for both officers and naturalists. At length, on April 22nd, the blissful island of Tahiti was reached, all warmth and fruit and flowers, and the anchor dropped in Matavai Bay for a happy month amongst the guileless natives, when, as Foster observed, the poet's lines:

"To dress, to dance, to sing, our sole delight,
The feast or bath by day, and love by night,"

could be applied to the ship's company with peculiar propriety.

Not quite a month, however, for Cook, with restored health and a robust crew set sail on May 15th, 1774, for a fresh voyage of discovery. If heaping coals of fire on

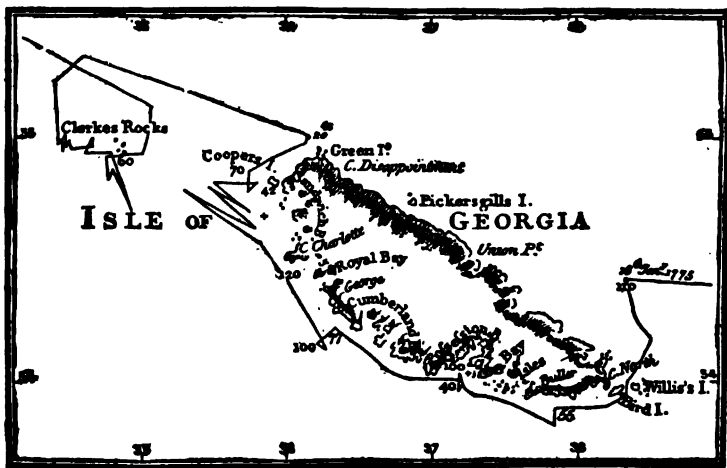
an enemy's head is an appropriate punishment, Cook's reply to Dalrymple's interminable strictures was to crown him with a burning fiery furnace seven times heated. Without uttering a word of anger or resentment, he proceeded calmly and systematically to wipe out of the map of the South Pacific, as he had already wiped out of the South Indian Ocean, every line of that imaginary continent which Dalrymple loved as his own soul. Quiros was now to share the fate of Juan Fernandez and Edward Davis. Proceeding to Australia del Espiritu Santos, which had been so gloriously annexed to Spain, Cook and the Resolution resolved the dazzling continent into a small, unhealthy archipelago inhabited by the most hopeless savages. He named the group the New Hebrides. Then, adding New Caledonia to his discoveries by the way, he regained New Zealand, ready to take advantage of the third Antarctic summer.

On November 10th, 1774, Cook left New Zealand bound for home after one more campaign in the ice. He crossed the meridian of 160° W. in 56° S., and held a course eastward between 57° and 53° S., meeting little ice and encountering no land until the islands of Tierra del Fuego were sighted on December 17th. Coasting those islands the Resolution found a favourable harbour, which received the name of Christmas Sound, for here on Christmas eve a lucky shooting expedition brought home a great bag of geese. No man probably ever cared less for the pleasures of the table than James Cook; but even he confessed that he had grown sick of the ancient salt beef and pork that remained of their stores. Fresh food of any kind was welcomed, the puppy-seals were tried and found palatable, the meat of the females was not much amiss, but the old bulls were voted abominable.

80 SIEGE OF THE SOUTH POLE

Penguins were thought disagreeable, but they were fresh and that made them go down. However, the geese were a rare treat and as a little Madeira wine was left, "the only article of our provisions that was mended by keeping," Cook remarked "our friends in England did not, perhaps, celebrate Christmas more cheerfully than we did."

The few days' rest after the dull months of monot-



COOK'S CHART OF THE ISLE OF GEORGIA.
(From Cook's "Second Voyage.")

onous hardship did good to all hands. The captain looked back with immense satisfaction to his proof that no vast temperate continent lay in the South Pacific, and he looked forward to yet another southward cruise before turning the bows of his weather-beaten ship homeward.

Cape Horn was doubled on December 29th, and a



Royal Bay, Isle of Georgia.
(From Cook's "Second Voyage.")

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fortnight was spent in surveying the neighbouring islands and sounds. Then Cook set sail to the eastward to explore the Gulf of St. Sebastian, a great bay in the coast-line of Dalrymple's Southern Continent. But past experience of Dalrymple's chart had filled Cook's mind with doubt as to the existence of any such coast-line, and when he found open sea in fact, where land was indicated on paper, he turned at once to a more hopeful quest. This was the land discovered by La Roche in 1675, and seen again by the ship *Leon* in 1756, which was reported to be in 54° 30' S., though the longitude was shown differently in various maps. Land was sighted on January 14th, 1775; at first it seemed to be only an ice island, but a sounding in 175 fathoms confirmed the opinion that it was indeed land, and from its thick covering of snow it seemed to be of great extent. On the 16th the *Resolution* was close up to the north coast, and during that day and the next cruised along it, naming the capes and bays. Three landings were made at different points, the British flag was hoisted and the captain "took possession of the Isle of Georgia in his Majesty's name, under a discharge of small arms."

This was the first discovery of a typical Antarctic land. True, it lay in a latitude corresponding to that of the north of England, but even at midsummer it possessed the climate of Greenland. Ice-cliffs came down at the head of the bays and masses of ice were continually breaking off and floating out to sea. If the coast was repellant, "the inner parts of the country were not less savage and horrible. The wild rocks raised their lofty summits till they were lost in the clouds, and the valleys lay covered with everlasting snow. Not a tree was to be seen, nor a shrub even big enough to make a tooth-

82 SIEGE OF THE SOUTH POLE

pick. The only vegetation we met with was a coarse long-bladed grass growing in tufts, wild burnet, and a plant like moss, which sprung from the rocks."

The shores swarmed with seals, especially at that season with females and innumerable cubs. It seemed to Cook absurd to call these creatures sea-lions, for he could see no resemblance in them to the king of beasts. There were great flocks of the largest size of penguins; some that were brought on board weighed from 29 to 38 pounds, and there were other sea-birds innumerable. When he reached the eastern extremity of the land Cook got bearings of the same features along the south coast that he had seen from the western end, and so he was obliged to conclude that despite its snows this was no continent but a small island. "I must confess," he adds, "the disappointment I now met with did not affect me much; for to judge of the bulk by the sample it would not be worth the discovery." Nevertheless, a point on the south coast was christened Cape Disappointment.

Cook was greatly impressed with the discovery of a snow-clad island, and at once concluded that Bouvet's Cape Circumcision might not have been an iceberg after all and that the South Atlantic might have more land in store for him than he would have time to explore. The weather became foggy and the winds light and variable, so that it was the 23rd before the Resolution left the neighbourhood of the Isle of Georgia and set out south-eastward. The parallel of 60° S. was crossed on the meridian of 30° W., but bergs and pack ice were found so closely massed in that position that it was necessary to turn again northeastward. On the way Cook discovered a rocky land which he named Southern Thule, because its latitude, 59° 13' S., was higher than that of any

southern land previously known. The lofty snow-covered summits were continued towards the north by a group of peaks, which were named Sandwich Land, in honour of the First Lord of the Admiralty, but the whole was so beset with ice as to be unapproachable in the thick weather that prevailed. The ship sailed northward for more than 200 miles in sight of the west coast of this new land before there was an open sea to the eastward.

Cook could not decide whether this chain of peaks was a line of islands or a promontory of the southern land. He felt convinced that an extensive land lay to the south for he could not otherwise account for the vast abundance of ice and for its unequal extension northward in different positions. This led him to expect that the snow-covered continent extended farthest to the north opposite the Southern Atlantic and the Indian oceans.

From near Sandwich Land in 58° S., 27° W., Cook steered due east to the meridian of Greenwich and then northeastward to the assigned latitude of Cape Circumcision, resolved this time not to let Bouvet's Island slip if it really existed, as he now believed it did. The great navigator, however, did not sufficiently allow for Bouvet's difficulties with the longitude, and his careful search from 6° E. to 22° E. was, of course, unavailing. This part of the ocean was found to be much less encumbered by ice than in 1772. Crossing their outward track south of South Africa, Cook's sailors could boast that they had not only put a girdle round the Earth farther south than it had ever been circled before, but that they had enough track over to tie a knot on it. Cook himself observed with quiet satisfaction that Mr. Dalrymple's coast-line of a southern continent in the South

84 SIEGE OF THE SOUTH POLE

Atlantic also was an error; and so he wiped that too from the map, leaving the far south of the globe a clean slate for the insertion of real discoveries.

At last, his labours over and well done, Cook bore up for Cape Town. On March 18th and 19th, when becalmed off the coast, he met a Dutch and a British ship, which supplied him with fresh provisions and the almost forgotten luxuries, tea and sugar. Old newspapers also, which were new to men three years away from civilisation, and the news that the *Adventure* had returned to the Cape a year before, having come round the Horn and crossed both Pacific and Atlantic nearly in 60° S., well to the south of the track of the *Resolution*. Cape Town was reached on March 22nd; there Cook met Crozet, of Marion's expedition and learnt from him of the discoveries of Marion and Kerguelen in detail. On July 30th, 1775, the *Resolution* dropped anchor at Spithead, and the most adventurous voyage since that of Magellan came to an end. The expedition returned after an absence of three years in good health, having lost only four men, three by accident and one from a disease which would probably have killed him sooner if he had stayed ashore. This record was unique and inaugurated a new era in long voyages, for thanks to the unceasing vigilance of Cook and the insistence with which he administered preventatives and enforced cleanliness, scurvy was shown to be no necessary accompaniment of life at sea.

Cook returned, not as the discoverer of a new continent, but as one who had achieved the far more difficult task of proving a negative beyond the cavil of his bitterest critic. "Had we found out a continent there," he said, "we might have been better enabled to gratify curi-

osity; but we hope our not having found it, after all our persevering searches, will leave less room for future speculations about unknown worlds waiting to be explored."

The vast masses of ice in the Antarctic region profoundly impressed the navigator and convinced him that there was indeed a frigid continent within the Antarctic circle, though he had not caught sight of it. As to the lands he had seen, and the nature of those beyond, he concluded:

"Countries condemned to everlasting rigidity by Nature, never to yield to the warmth of the sun, for whose wild and desolate aspect I find no words; such are the countries we have discovered; what then may those resemble which lie still further to the south? . . . Should anyone possess the resolution and the fortitude to elucidate this point by pushing yet further south than I have done, I shall not envy him the fame of his discovery, but I make bold to declare that the world will derive no benefit from it."

Looking back on the hardships and the difficulties of his attempts to penetrate the Antarctic regions, Cook was even led to declare that he believed no man would ever push farther south than he had done and that the region round the southern pole would always remain sealed up in its ice, unknown to man. He considered that his proof of the possibility of preserving the health of a ship's company at sea throughout a long and trying voyage was the greatest of his achievements and enough in itself to make the voyage memorable "when the disputes about a southern continent shall have ceased to engage the attention and to divide the judgment of philosophers." The Royal Society awarded him the

86 SIEGE OF THE SOUTH POLE

Copley medal, not for his discoveries in geography, but for this demonstration in hygiene.

Dalrymple was vanquished, but he held his peace; he had returned to India in a high official position, and on his retirement from the East India Company's service, he sunk his old differences with the Admiralty and became its first hydrographer, when that office was instituted in 1795. Eleven years later he was dismissed for some characteristic excess of zeal, and died of a broken heart.

It is interesting to speculate as to what the result might have been if instead of leaving the wide section south of New Zealand unvisited, because from the direction of the wind he believed there was no land there unless it lay very far to the south, Cook had endeavoured to push south to the southward, say of Tasmania. He might have found a clear sea and discovered the coast of Victoria Land. He might, probably enough, have been frozen in the pack, and with his inadequate provision for meeting the added strain of cold and darkness, it is not too much to say that the chance of his escape would have been small indeed.

The only honour bestowed on Cook by the government for his stupendous service to science and to his country, was a step in naval rank. But he also received the command of a new expedition to sail in the following year and to attempt for the unknown north polar regions what he had already done in the far south. To a man of his nature, this was perhaps the greatest possible reward, but the new work was his last, and his death left it uncompleted.

For nearly a generation no other vessel ventured into the southern ice bent on exploration. But the merchants

of London were on the alert for new fields of commercial adventure, and the description of the vast abundance of seals in Cook's report on the Isle of Georgia fell on attentive ears. It is difficult for us to realise the vast importance of animal oil at the end of the eighteenth century. As a lubricant for machinery, the use of which was steadily extending in every branch of industry, it was important; but for the purposes of illumination it was indispensable. Electric light was only known as the spark from a frictional electric machine; coal-gas was occasionally produced as a laboratory experiment, but Lord Dundonald's attempt in 1787 to use it for illumination was laughed at as the fad of a mad sailor; mineral oil was only used in China and some scarcely known parts of Central Asia; wax candles lighted the houses of the rich alone; the poor had to be content with tallow dips. The lighting of towns was becoming general and whale oil or seal oil was the only form of fuel that was thought fit for the purpose. The whalers of the North were then in the zenith of their glory, and great fleets sailed each year for the Greenland seas and came back laden with catches which now seem almost fabulous. The hunters of the sperm whale had begun their long voyages in the tropical oceans, the wildest and most adventurous form of all seafaring, but still the demand increased, far exceeding the supply, and a new oil-field where the whale or blubber-seal could be met with was in the quieter commercial life of the last quarter of the eighteenth century, as great a discovery in its own way, as a new petroleum field was in the last quarter of the nineteenth.

As early as the year 1778 the English sealers brought back from the Isle of Georgia and Magellan Strait as

88 SIEGE OF THE SOUTH POLE

many as 40,000 seal-skins, and 2800 tons of sea-elephant oil, the latter valued at £40,000, and by 1801 the import of oil from those regions reached 6000 tons, worth £172,500. In 1791 no less than 102 vessels, averaging 200 tons burden and manned by 3000 sailors, were engaged in securing fur-seals and oil in the Southern Ocean, and the value of their cargoes in that year was estimated at £235,000. The voyage of Cook, which cost under £20,000, thus had proved a very profitable investment for the nation as a mere matter of money, apart from the prestige acquired, especially in France, notwithstanding the war, by Cook's services to science and to humanity. With so rich a harvest waiting to be gathered at the very edge of the icy seas the sealers naturally felt little temptation to wander farther afield and incur certain dangers for uncertain gain. Thus there is no sure knowledge of any discovery having been made by British sealers up to the end of the eighteenth century.

When commerce begins to assert itself the history of exploration inevitably becomes troubled and contradictory. The commercial explorer owes his first duty to the firms employing him, and in order to safeguard their interests he must keep silence amongst outsiders as to what he has seen. He may even consider it expedient to permit a *suggestio falsi* to arise in quarters where judicious discouragement might secure him freedom from competition. "It is much to be regretted," says Weddell, "that any men should be so ill advised as to propagate hydrographical falsehoods; and I pity those who, when they meet with an appearance that is likely to throw some light on the state of the globe, are led through pusillanimity to forego the examination of it. But the extreme reluctance I have to excite painful feelings anywhere,

restrains me from dealing that just censure which is due to many of my fellow-seamen, who by negligence, narrow views of pecuniary interest, or timidity, have omitted many practicable investigations." The evil was evidently acutely felt at the time when this was written, about 1824. Long after the monopoly of information has lost its values the logs of old voyages may sometimes be recovered in the archives of the business houses which had carried on the trade; but too often they have been destroyed or lost sight of before the historian begins to inquire about them. This difficulty applies especially to the beginnings of things, and so we cannot now speak with certainty as to the first practical men who turned Cook's second voyage to account.

The last episode of the dwindling eighteenth century in the southern seas was the reputed discovery of the Aurora Islands, a group which for a time was the object of almost as much interest as Cape Circumcision itself, though they no longer figure on the chart. It was in 1762 that the ship *Aurora* on her return from Lima, sighted two islands about 35 leagues to the east of the Falklands; the larger was several miles in extent, and the ship passed between the two in latitude $53^{\circ} 15' S$. Islands in a similar position were seen in 1769 from the *San Miguel*, and in 1774 the *Aurora* once more saw two islands, one in $53^{\circ} 38' S$., about three leagues in length, separated from another at a distance of about three or four leagues to the E.S.E. The islands were seen again in 1779 and in 1790, and finally in 1794 the Spanish government sent the corvette *Atrevida* to fix their position. This ship, provided with chronometers, left the Falklands on January 10th, 1794. After a slow voyage, much protracted by fog and bad weather, the *Atrevida* sighted

90 SIEGE OF THE SOUTH POLE

a great mountain like a tent divided vertically into two parts, one side white with snow, the other very dark; this was taken to be the island in question and was coasted within a mile of the land, and next day a second island was seen, not so high as the first, and about ten miles to the northeast. Several days were lost waiting for the sun to appear to make an observation possible, and at last the positions were obtained as $53^{\circ} 15' \text{ S.}$ and $41^{\circ} 4' \text{ W.}$ of Cadiz for the first island, and $52^{\circ} 37' \text{ S.}$ and $41^{\circ} 26' \text{ W.}$ of Cadiz for the second. The cruise of the *Atrevida* was a piece of simple marine surveying, of no importance in exploration; but it is mentioned here to show how extremely uncertain the positions assigned to discoveries at sea often are, even in localities far removed from the atmospheric illusions peculiar to the polar seas.

CHAPTER V.

AMERICAN SEALERS IN THE SOUTH

"Ever they hear the floe-pack clear and the blast of the old bull-whale
And the deep seal-roar that beats off-shore above the loudest gale;
Ever they greet the hunted fleet—lone keels off headlands drear—
When the sealing schooners flit that way, at hazard, year by year."

—RUDYARD KIPLING.

WHERE nearly everything is left to conjecture it is impossible to trace out clearly the succession of events which led to the next advance in discovery. It is now, we fear, impossible to say when the first American sealer made his way to South Georgia, the name by which Cook's "Isle of Georgia" has been known since the beginning of the nineteenth century. Weddell, writing in 1825, when both fur-seals and sea-elephants were almost extinct on the island, mentioned that the fur seal-skins brought with the sea-elephant oil to England were of so little value on account of the furriers not knowing how to dress them, that their capture was almost neglected. "At the same time," he says, "the Americans were carrying from Georgia cargoes of these skins to China, where they frequently obtained a price of from 5 to 6 dollars apiece. It is generally known that the English did not enjoy the same privilege; by which

92 SIEGE OF THE SOUTH POLE

means the Americans took entirely out of our hands this valuable article of trade."

The whole question of American enterprise in the Antarctic regions has been discussed by Mr. Balch in his "Antarctica," a work embodying a great deal of careful research into old records, and to this we are much indebted. The first light on the subject comes from Swain's Island, which does not now appear on the chart, but it is reported on the authority of Edmund Fanning that an island to which he gave that name was discovered in 1800 in $59^{\circ} 30' S.$, $100^{\circ} W.$, by Captain Swain, of Nantucket, and that it was "resorted to by many seals." It is probably Dougherty Island.

According to a communication which was made by Captain J. Horsburgh, Hydrographer to the East India Company, to Professor Heinrich Berghaus, the distinguished author of the "Physical Atlas," American sealers had been at work in the South Shetlands since 1812, and had kept their field of operations a profound secret in order to exclude competitors. The shadowy forms of Captain Swain, of Nantucket, and his crew of phantom Yankees may be imagined breaking in upon the "rookeries" of those mist-wreathed island beaches slaying, skinning and boiling out the blubber of unknown and now perhaps extinct species of seals. We have seen that so far as the trade in seal oil was concerned the Americans had no monopoly. To the later explorations initiated by the enlightened firm of Enderby Brothers, we devote a special chapter; but their association with the far southern trade began before the century. We first hear of their ships in the southern seas in October, 1808, when the *Snow Swan* under James Lindsay, and the *Otter* under Thomas Hopper on a

whaling cruise in the South Atlantic, came upon Bouvet's Cape Circumcision. Fog and ice, the usual companions of the mariner in those seas, did not allow them to land though Lindsay stayed in the neighbourhood for a week, but they fixed the position of the Cape as $54^{\circ} 15' S.$ and $4^{\circ} 15' E.$ But during the first decades of the nineteenth century the American interest in the seal-fisheries probably outweighed the British. How keen it must have been is shown by the fact that Edmund Fanning was appointed in 1812 commander of a United States expedition, in the *Volunteer* and *Hope*, for a voyage of discovery to explore the southern hemisphere and circumnavigate the globe. The unfortunate war between Great Britain and the United States which broke out in that year made it impossible to proceed with the expedition. Though the smoke of war now involved the whole of Europe and North America, and the outlook for the future was black enough at home, the old Hanseatic motto held its force "*Necessare est navigare*" and year by year more and more ships sought the stormy neighbourhood of the Horn. After the final struggle of 1815 when the disturber of the peace of Europe was himself enlisted in the solitudes of the South Atlantic the traders of the east and west sailed southward in increasing numbers.

The first absolutely clear episode in the history of Antarctic discovery since Cook was due to a British seaman, William Smith, captain of the brig *Williams*, of Blyth, one of the north country craft so highly rated by Cook. Trading between Montevideo and Valparaiso he brought his ship round Cape Horn with a bold southward sweep in February, 1819, believing that by keeping far off the land he would find better weather for making what is always

94 SIEGE OF THE SOUTH POLE

an anxious passage under sail. On the 19th, in latitude $62^{\circ} 40'$ S. and longitude 60° W. he thought he saw land. Night fell before he could make quite sure and he prudently hauled off to the north for the few hours of darkness of the southern summer night and stood south again next day when the land appeared to him to be unmistakable.

He happened to have a valuable cargo on board and being himself part owner of the ship he was afraid to run the risk of a storm descending upon him when off an unknown coast; being afraid too that the underwriters might make trouble about his insurances if he were to convert a coasting trip into a voyage of discovery, he resumed his course and reached Valparaiso in due time. Smith spoke of his discovery to the English residents at the Chilean port, but was only laughed at for his pains, and it would appear that some of his ship's company thought that no land had been seen but merely icebergs. It was about mid-winter (June, 1819) before Smith obtained a return cargo, and although he ran south to $62^{\circ} 12'$ he saw nothing of the land and nearly got caught in the sea-ice from which he was glad to escape even without confirmation of his discovery. At Montevideo as at Valparaiso incredulity and ridicule were all he received from his countrymen, but a party of Americans approached him desirous of further information and promising to charter his brig for a sealing voyage on very favourable terms if he would only tell them the exact position of the alleged new land.

In order to understand the keenness of international rivalry at this period we must remember that three American whale-ships went round Cape Horn for every one under the British flag. Reckless extermination was the



Elephant Island, one of the South Shetlands.
(From D'Urville's *Atlas*.)

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only method of seal-hunting resorted to on the islands of South Georgia and the coasts of South America so that the first in the field at a new sealing ground was sure of an immense booty, and late-comers as likely as not would have to go empty away. Smith was determined that he would not part with his secret without an equivalent to anyone but a British subject and absolutely refused to give the American inquirers the information they wanted. He offered to take them to the southern land for a sealing voyage and if he could not find it to charge nothing for the use of his vessel, but that remarkably liberal offer was rejected; the inquirers wanted chiefly to know exactly where the land lay. Several months elapsed before he could get a cargo together for another trip to Chile. At last he succeeded and on October 15th, 1819, came up with the land in the position where he had seen it before, got soundings in 40 fathoms and next day sent a boat ashore with the first mate to plant the Union Jack and take possession for Great Britain. He called the new land New South Britain but afterwards changed the name to New South Shetland because it was situated in the same latitude as the Shetland Isles of the northern hemisphere. The name did not imply any opinion as to the insular nature of the new land to part of which he refers as the mainland, and the name of Antarctic Continent was even revived for it by some German geographers when the discovery became known in Europe in the following year.

Smith spent some days in cruising along the coast, standing out to sea at night and returning in the morning toward the land, picking out now a cape and now a mountain in the fog and naming them more or less appropriately, occasionally losing sight of the coast, and ap-

96 SIEGE OF THE SOUTH POLE

parently making no other landing. The scenery reminded him strongly of Norway, so strongly that he even imagined he could see pine trees waving on the distant slopes, and he satisfied himself that the rocks and off-lying islands swarmed with fur-seals, blubber-seals and birds in great variety. Whales too abounded including what he declared to be "the true spermaceti whale."

Altogether Smith saw the land more or less continuously along a course of 250 miles, and on reaching Valparaiso at the end of November he was able to give such particulars as convinced the British residents of the reality of the discovery. Apart from the enormous value for the seal and whale fishery the prospect of having some British possession, however desolate, within ten days' sail was very welcome to Smith's compatriots who did not feel too secure under the government of a new republic still at war with its mother country. They resented the recent abandonment of the Falkland Islands and were intensely anxious to have some outpost of the empire nearer than Cape Town on the one side and Sydney on the other. These feelings were fully shared by the British naval commander on the Pacific Station, Captain W. H. Shirreff, who on hearing Smith's story resolved to take immediate action. Mr. J. Miers, F. R. S., the merchant to whom we are indebted for the first description of the finding of New South Shetland, had commenced to load the Williams for her return voyage when Captain Shirreff chartered her for a cruise of exploration, and Miers, who was an enthusiastic naturalist, at once transferred his cargo to another vessel and gladly set the brig free for her more important work. Edward Bransfield, Master R. N., was put in charge, and three midshipmen of H. M. S. *Andromache* accompanied

him to aid in surveying. Dr. Young of H. M. S. Slaney* also volunteered, as a surgeon was considered necessary, and the brig sailed on December 19th.

Bransfield reached the new land on January 16th, 1820, and remained off its coasts until March 21st, following it for 9° or 10° to the eastward and about 3° from north to south. He sailed amongst the islands and charted them, going as far south as $64^{\circ} 30'$, but did not apparently determine whether the land was entirely insular or in part continental. He landed at one point at least and found the only vegetation to consist of stunted grass. Trees were entirely absent.

The question as to the priority of discovery by Dirk Gerritsz is hardly worth discussing as the evidence on which his connection with the South Shetlands is based is now known to be so very slight. Slight though it was, however, it would apparently have led to the discovery of the group in 1820 whether Smith had sighted it or not.

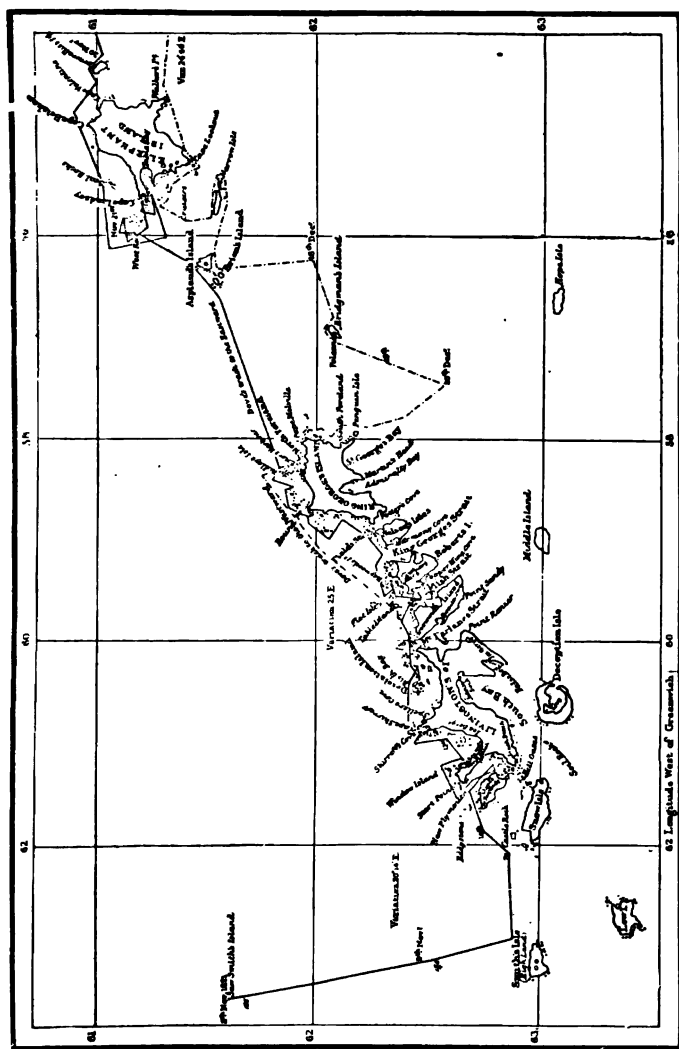
Stonington, Connecticut, a small town of seafaring folk, now comes into prominence as a centre of the southern sealing enterprise of the United States. Fleets of small vessels were fitted out there year after year, and the pluck of their skippers and crews led them often far into the Antarctic regions. Amongst the many captains who sailed out of Stonington a few have become famous and left their names as memorials on the lands they explored and despoiled. The first experiment of

* An amusing error has crept into several books of reference through Dr. Young dating an anonymous description of the cruise, which appeared in the *Edinburgh Philosophical Journal* from "H. M. S. Slaney." The address was taken for a signature and a mythical Mr. Slaney has thus been credited with the authorship of the account.

98 SIEGE OF THE SOUTH POLE

which we have definite information was due to the initiative of Mr. Edmund Fanning, who had before that time been in South Georgia and formed theories as to the proximity of land to the south based on the drifting of the ice. He had also read of Gerritsz's reported discovery and resolved that the matter was worthy of being put to the test; moreover, he knew of the cruise of Captain Swain of Nantucket in those waters, and he also knew a great deal more than he set down as to the doings of earlier sealers. Anyhow, in July, 1819, the *Hersilia* sailed from Stonington under the command of James P. Sheffield with W. A. Fanning as supercargo. They visited the Aurora islands, or some land which was taken for them, and sailing south to 63° discovered what they took to be the land of Dirk Gerritsz, naming several islands and landing on one at a place named *Hersilia Cove* in February, 1820. If the latitude is correct these islands must have been members of the South Shetland group, and the *Williams* and *Hersilia* must for a time have been very near neighbours though they did not sight each other. The *Hersilia* came home without delay bringing a quantity of sealskins, including those of the valuable southern fur-seal. There was a flutter of excitement at Stonington, and energetic steps were taken to follow up this successful voyage.

The southern summer of 1820-21 was a dark one for the fur-seals whose ancestors had basked upon the shores of the South Shetlands for untold centuries, following their quaint semi-civilised life and pursuing their patriarchal customs of war and love undisturbed by any being capable of contending with them. The sentry bulls saw, with the stolid unconcern of ignorance, the approach of a fleet of five sail; certainly it was without



Powell's Chart of the South Shetlands.

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fear or suspicion, for the intruders found they could butcher the unresisting beasts without any preliminary trouble of hunting or stalking. Nor were the Americans alone, British enterprise was equally ready to profit by the new discovery, and there is little doubt that at least as many ships flew the red ensign as the stars and stripes that summer amongst the southern isles. The killing of seals, perhaps from the total ignorance of the victims of the threatened fate, perhaps from the almost human family affection they display, perhaps from the pathos of their innocent eyes, seems nearer murder than any other form of butchery or sport, and the first assault upon such a tribe of creatures is really painful to think about. Harrowing tales are told by the seal-slayers themselves, some of whom, if their narratives are to be trusted, spent a large part of their sea-time in shedding "manly tears" over the ordinary risks of their calling; but we need not dwell upon scenes to which our readers will not have time to become hardened, and the tragedy of the fur-seal may be left to form a dark but unobtrusive background to the lighter features of this period of discovery.

The five American vessels were the brig Frederick under the command of Benjamin Pendleton, in charge of the fleet; the brig Hersilia again under James P. Sheffield; the schooners Express and Free Gift and the forty-ton cutter Hero, whose skipper was Nathaniel B. Palmer. They found headquarters in Yankee Harbour, Deception Island, in 63° S., a cove in the remarkable natural harbour formed by the sea invading the central hollow of a huge volcanic crater, a portion of the side of which had broken down. The island, in fact, is a mere ring of volcanic rock rising from deep water to a great height

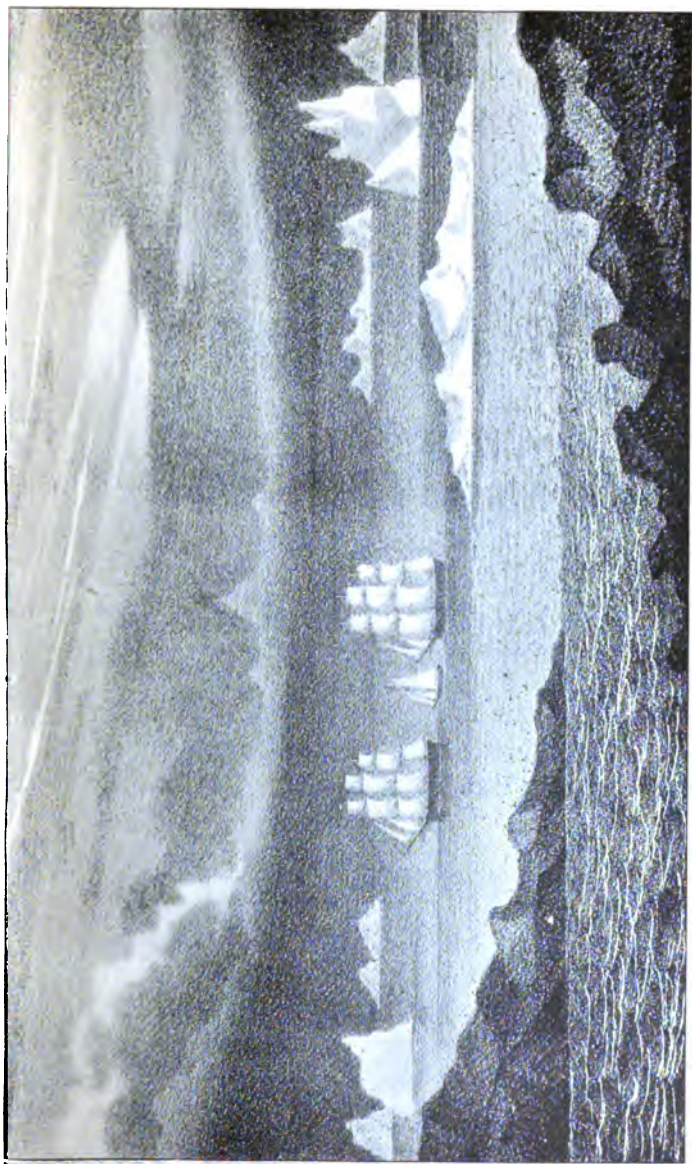
100 SIEGE OF THE SOUTH POLE

and forming as fine a look-out as the crater forms a harbour. On this look-out Captain Pendleton observed one clear day several mountains far to the south, one of them an active volcano.

Captain Palmer was sent off in the little Hero to look more closely at the new mountains, and he found them to be part of a great region stretching far to the south laden with snow, and even at midsummer edged along the coast with a girdle of ice which discouraged any attempt at landing. It was not, perhaps, a very interesting land to its discoverer, for there were no fur-seals on the shore, only the spotted sea-leopard, which could bide its time till its more valuable comrade of the sea was extinct.

On his way back from the discovery of his land, Palmer met the not uncommon fate of being enveloped in a thick fog, a dreary circumstance in any part of the ocean, but unutterably so when one knows one's ship to be absolutely alone upon the sea, save for the drifting bergs. When the fog lifted Palmer looked to port and starboard with amazement to find on either side of him a full-rigged frigate and a sloop of war, nor could his astonishment be much lessened when in response to his hoisting the "gridiron," they responded with the St. Andrew's Cross. Fanning tells the story pleasantly, and we may quote his words:

"These ships he then found were the two discovery ships sent out by the Emperor Alexander of Russia, on a voyage round the world. To the commodore's interrogatory if he had any knowledge of those islands then in sight, and what they were, Captain P. replied, he was well acquainted with them, and that they were the South Shetlands, at the same time making a tender



The Meeting of Palmer and Bellingshausen.

(From Fanning's "Voyages Round the World.")

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of his services to pilot the ships into a good harbor at Deception Island, the nearest by, where water and refreshment such as the islands afforded could be obtained; he also informed the Russian officer that his vessel belonged to a fleet of five sail, out of Stonington, under command of Captain B. Pendleton, and then at anchor in Yankee Harbor, who, would most cheerfully render any assistance in his power. The commodore thanked him kindly, 'but previous to our being enveloped in the fog,' said he, 'we had sight of those islands, and concluded we had made a discovery, but behold, when the fog lifts, to my great surprise, here is an American vessel, apparently in as fine order as if it were but yesterday she had left the United States; not only this, but her master is ready to pilot my vessels into port; we must surrender the palm to you Americans,' continued he, very flatteringly. His astonishment was yet more increased when Captain Palmer informed him of the existence of an immense extent of land to the south, whose mountains might be seen from the mast-head when the fog should clear away entirely. Captain Palmer, while on board the frigate, was entertained in the most friendly manner, and the commodore was so forcibly struck with the circumstances of the case, that he named the coast then to the south Palmer's Land."

The incident as a whole has an air of probability; the courteous speech and generous recognition of the work of others were characteristic of Bellingshausen, who was in every thought and act a man of whom any navy might be proud. But we feel sure that Bellingshausen never claimed the discovery of the South Shetlands, the existence of which he knew of beforehand; and it seems strange that if informed of the whereabouts of Palmer

102 SIEGE OF THE SOUTH POLE

Land he made no reference to that fact in his own book or in the atlas accompanying it.

Palmer well deserved any kindly attention shown by Bellingshausen, and we feel almost sorry that it was his brother, Captain A. S. Palmer, who was the hero of the pleasing little description by Dr. Webster of H. M. S. Chanticleer, to which vessel a similar service was performed in Tierra del Fuego eight years later:

“When he made his appearance on board the brig with Captain Foster, we took him for another Robinson Crusoe in the shape of some shipwrecked mariner. He was a kind and good-hearted man and, thinking that they would be a treat to us, had brought with him a basket of albatross’ eggs, which were to us a most acceptable present.”

The Stonington fleet returned in the following year, when Palmer in a stouter vessel, the *James Monroe* of eighty tons, continued the exploration of the land named after him. Unfortunately, Fanning, whose description is the only one we know of, is deplorably vague as to positions, and it is hard to make sense of his statement:

“After proceeding to the southward, he met ice fast and firmly attached to the shore of Palmer’s Land; he then traced the coast to the eastward, keeping as near the shore as the ice would suffer; at times he was able to come along shore, at other points he could not approach within from one to several miles, owing to the firm ices, although it was in December and January, the middle summer months in this hemisphere. In this way he coasted along this continent upwards of fifteen degrees, viz., from 64° and odd, down below the 49th of west longitude. The coast, as he proceeded to the eastward, became more clear of ice, so that he was able to trace the shore better;

in $61^{\circ} 41'$ south latitude, a strait was discovered, which he named Washington Strait, this he entered and about a league within came to a fine bay, which he named Monroe bay, at the head of this was a good harbor; here they anchored, calling it Palmer's Harbor."

If Palmer followed the coast to 49° W. he followed it into what is certainly open sea, and if he found a harbour in $61^{\circ} 41'$ S. it could be in no known land. Fanning apparently suggests that Palmer's harbour lay in 49° W., which is far to the east of any land except the South Orkneys; and from Powell's map there is no doubt that what Palmer followed was the edge of the pack which that season stretched unbroken to the South Orkneys where the strait he threaded and the harbour in which he anchored are duly charted. Nathaniel B. Palmer continued to follow the sea for many a year and died in 1877 at the age of seventy-eight.

Captain George Powell, apparently a British sealer, accompanied Palmer in the sloop Dove for a considerable part of his cruise in 1821-22, and gave a clear account of his track in an excellent chart published in London on his return. This shows that he had not only improved the survey of the South Shetlands, but discovered and surveyed the group of islands usually called the South Orkneys, but originally known as the Powell Islands, a name to which it would seem only right to return. Powell might have done much as an explorer, but he perished in a squabble with the natives of Tonga in 1824 at the age of twenty-nine.

For years to come the Americans regularly visited the South Shetlands, South Georgia and neighbouring islands and did not cease until the fur seal was extinct, and even the hair seal had become scarce. The exploits

of one other amongst their number must be referred to, Benjamin Morrell, who in 1832 published a book of his voyages resembling in many respects that published by Edmund Fanning in the following year, from which we have already quoted. Fanning was vague, but Morrell was vaguer as to dates and places, and moreover, he was intolerably vain and as great a braggart as any hero of autobiographical romance. That he did sail to the Antarctic regions we cannot doubt, for he mentions the names of too many men still living at the time of publication to leave that matter in question; but the greater part of his most entertaining narrative concerns the happy isles of the Pacific and the troubled coast of South America. The incidents in his book are frequently very similar to those recorded by Weddell and other voyagers, whose published writings Morrell had seen, but in every case they are more remarkable and highly coloured, while the sheer absurdity of some of them shows that the author is romancing regardless of fact.

Morrell says he was a wild youth, running away to sea in 1812, to be speedily taken by a British man-of-war and detained for eight months a prisoner of war at St. John's, Newfoundland, and after liberation back to the sea again, his valour no whit abated, though his second voyage landed him a prisoner of war on Dartmoor for two years. In June, 1821, "having heard much of the South Shetland Islands," which as we have seen, were discovered three years before, though previously he had only sailed before the mast, he received the post of first mate on the *Wasp* under Captain Robert Johnson, and started on a sealing voyage. Here remarkable adventures befell him in the way of hairbreadth escapes from drowning, from freezing to death in a gale in a small

boat fifty miles from his ship, and in extricating the schooner from deadly peril in the pack. This last exploit illustrates his presence of mind and his rhetorical instinct, for in giving orders for a manœuvre requiring instant action, he quotes a speech of ninety-one eloquent words in which he adjured the men to exert themselves!

On his return, Morrell at the age of twenty-seven, was given command of the *Wasp* and sent off on a South Sea sealing voyage, leaving New York on June 30, 1822. He was permitted by his owners to make explorations in the Antarctic regions and he did not lack confidence in the powers of the human race or of himself, for as he put it:

“The march of intellect is irresistible; and were the earth itself one globe of ice, the fire of genius, directed by the wand of science, could melt a passage to its centre. The day is not far distant when a visit to the South Pole will not be thought more of a miracle than to cause an egg to stand upon its point.”

The truth of Morrell's voyage has been so seriously questioned that many geographers prefer to ignore it. We cannot altogether share that view, for a man may be ignorant, boastful and obscure, and yet have done a solid piece of work, though his account of it is crusted thick with exaggeration and mistake. Such a description may stimulate a more sober-minded explorer to outdo the deeds of the boaster and advance knowledge more than if he had had no claimant before his eyes to confirm or confute. Hence, since Morrell's Antarctic voyage is little known, we shall give an abstract of his account of it, with such remarks as may be necessary.

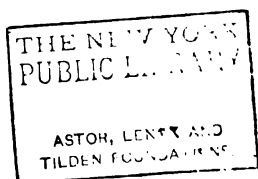
Several months were spent in surveying the coast of

106 SIEGE OF THE SOUTH POLE

Patagonia, and the first fortnight of November 1822 was occupied in a purposeless search for the Aurora Islands, although Morrell had just met his old captain, Johnson, at the Falklands, returning from the same hopeless quest, and knew of Weddell's exhaustive and conclusive search made two years before. He then visited South Georgia but found no fur-seals, and on December 6th, arrived without any apparent difficulty at "Bouvette's Island, so called from being first seen by that navigator in October, 1808." Here the fore-shortening of time is painfully in evidence, since Bouvet's Cape Circumcision of 1738 is run into Lindsay and Hopper's rediscovery in 1808, with a considerable flavour of Norris's landing in 1825. The only interesting fact is that this reference proves that in 1832, when Morrell's book was published, the fact that the island had been seen in 1808 (and also in 1825) was known among the southern sealers. According to Morrell, Bouvet Island was over 25 miles in circumference, situated in latitude $54^{\circ} 15' S.$, longitude $6^{\circ} 11' E.$, and off the west end of the island where there was a beach, a chain of grounded icebergs shut in a tranquil harbour, in which the Wasp anchored in 17 fathoms half a mile from shore. Rather fewer than two hundred skins were yielded by this beach, on which, the seals were so tame "that they would come up and play among the men who were skinning their companions." A circumnavigation of the island showed that there was no other point save this beach on which a seal could land. The island was of volcanic rock, the cliffs in some parts presenting the appearance of blue and green glass; the mountain, which rose some 3000 feet above the sea-level, was covered with pumice-stone, with some patches of vegetation. Not a word is said as



Benjamin Morrell, Jr.



to its being snow-covered, nor does the weather seem to have been foggy.

On December 8th the Wasp left, steering southeast, and on the 13th she was in $60^{\circ} 11' S.$, $10^{\circ} 23' E.$, and thence she made for Kerguelen Land. After seal-hunting round the island from December 31st to January 12th, 1823, the Wasp headed southwest, and on the 22nd, was in $62^{\circ} 27' S.$ and $94^{\circ} 11' E.$ Here a number of great icebergs made it necessary to turn northward, and the voyage was continued between 50° and 58° as far east as $117^{\circ} E.$, a point due south of Western Australia. Hitherto, the weather had been bad, but on February 1st it became clear and pleasant, with a northeast wind. Now comes the part of the voyage concerning the truth of which most doubt has been entertained, and as it is unfortunately dismissed in very few words, we quote it exactly as it is given in Morrell's book:

"By an observaton at noon we were in lat. $64^{\circ} 52' S.$, long. $118^{\circ} 27' E.$ The wind soon freshened to an eleven-knot breeze, and we embraced this opportunity of making to the west; being, however, convinced that the farther we went south beyond lat. 64° the less ice was to be apprehended, we steered a little to the southward until *we crossed the antarctic circle* and were in lat. $69^{\circ} 11' S.$, long. $48^{\circ} 15' E.$ In this latitude there was *no field-ice*, and very few ice-islands in sight. We likewise discovered that the winds in this latitude blow three-fourths of the time from the southeast, or the northeast, very light, and attended with more or less snow, every day; and that the westerly winds were accompanied with severe hail-squalls.

"February 23d.—We continued steering to the westward with every necessary caution until 4 p. m., when

108 SIEGE OF THE SOUTH POLE

being in lat. $69^{\circ} 42' S.$, we crossed the meridian of Greenwich in a fine clear day, and with the wind from S. E. to S. S. W., from which quarter it had blown for the last four days. We now steered for the north and west for Sandwich Land."

Sandwich Land was reached on February 28th, and the interest of this part of the voyage makes a short discussion necessary. Up to February 1st, the track from Kerguelen Land eastward lay to the north of Cook's, and the point where the westward voyage began is in waters that have been frequently visited since 1823. If the course from this point had been due west no one would feel inclined to question it; and if Morrell had only stated the longitude at which he "steered a little to the south" and that at which he crossed the Antarctic circle we could easily follow and criticise the track. Observations made by all subsequent voyagers in those seas show the extreme probability of southeasterly winds prevailing south of $64^{\circ} S.$, and so far as we can ascertain, Morrell was the only man except Balleny who ever tried to sail westward for any distance south of $60^{\circ} S.$ with a view of penetrating the ice. All other explorers had tried to get south when sailing from west to east against the prevailing winds of high latitudes. If Morrell steered southward and crossed the Antarctic circle about $115^{\circ} E.$, he must have passed to the southward of the land charted as Budd Land, Knox Land, Termination Land, Kemp Land, Enderby Land, and Kaiser Wilhelm II. Land, proving them (if they all exist) to be islands; but between his position south of Enderby Land in $48^{\circ} 15' E.$, and the meridian of Greenwich, where he turned northward, his track lay so near the farthest south gained between those meridians by Cook, Biscoe, Bell-

ingshausen, and Ross, that it is easily credible. There is no inherent improbability in the insular character of the reported lands behind which Morrell seems to claim to have passed; but there is nothing in his narrative to show that he may not have passed to the north of them; there is no improbability in a track of open water being found south of the floating pack-ice. The speed of the voyage is indeed remarkable and some parts of it almost incredible, but we are not disposed to place much confidence in the longitudes assigned, even if we allow that the cruise is honestly reported.

After leaving Sandwich Land Morrell turned southwest again, passed through a heavy pack and came out into an open sea in $64^{\circ} 21' \text{ S.}$, $38^{\circ} 51' \text{ W.}$, on March 10th, reaching $70^{\circ} 14' \text{ S.}$ in $40^{\circ} 3' \text{ W.}$ on March 14th, 1823. Here, he says, he found the temperature of the air to be 47° and that of the water 44° , values certainly at least ten and perhaps fifteen degrees higher than we can believe possible in such a latitude and at such a date. Weddell, a month before, had broken his only two thermometers a short distance to the north of the same position; but said that the air and water were no colder than they were ten degrees (of latitude) further north. Could Morrell have "corrected" Weddell's temperatures for 60° S. by ten degrees of temperature, and claimed these figures as representative of the conditions in 70° S. ? It is curious to notice that Morrell refers to Weddell as having reached a higher latitude in the same sea the year before, whereas it was in the same year and only a month earlier. From his farthest south, Morrell bore northwest and coasted some part of the land called New South Greenland by Johnson to its north cape, in $62^{\circ} 41' \text{ S.}$ This was probably intended for the land known later as

110 SIEGE OF THE SOUTH POLE

Louis Philippe Land and Joinville Land, but if so, its longitude was wrong by 10° . Although a new ship several years later was built for this adventurous skipper and named the *Antarctic*, he never seems to have gone towards the ice with her, and we leave Captain Benjamin Morrell, Jr., with his reflections at the farthest south.

“I regret extremely that circumstances would not permit me to proceed farther south, when I was in lat. $70^{\circ} 14' S.$, on Friday, the 14th day of March, 1823, as I should then have been able, without the least doubt, to penetrate as far as the eighty-fifth degree of south latitude. But situated as I then was, without fuel, and with not sufficient water to last twenty days,—destitute of the various nautical and mathematical instruments requisite for such an enterprise, and without the aid of such scientific gentlemen as discovery ships should always be supplied with; taking all these things into consideration, I felt myself compelled to abandon, for the present, the glorious attempt to make a bold advance directly to the South Pole. The way was open before me, clear and unobstructed; the temperature of the air and water mild; the weather pleasant; the wind fair. . . . The anguish of my regret, however, was much alleviated by the hope that on my return to the United States, an appeal to the government of my country for countenance and assistance in this (if successful) magnificent enterprise would not be made in vain. To the only free nation on earth should belong the glory of exploring a spot of the globe which is the *ne plus ultra* of latitude, where all the degrees of longitude are merged into a single point, and where the sun appears to revolve in a horizontal circle. But this splendid hope has since been lost in the gloom of disappointment! The vassals of some petty despot

may one day place this precious jewel of discovery in the diadem of their royal master. Would to heaven it might be set among the stars of our national banner! . . . I have no doubt that the British government, ever foremost to encourage genius and reward merit, will yet give my much esteemed and worthy friend, Captain Weddell, another opportunity of distinguishing himself with the command of an expedition towards the South Pole."

Looking at the brevity and comparative indifference with which the eloquent Morrell dismisses the Antarctic part of his voyages we are inclined to believe that he did make a passage from somewhere near the meridian of Kerguelen toward Weddell Sea at a high latitude; but on account of his blunders, his acknowledged habit of building the experience of others into his story and the silence of his contemporaries as to his exploits, we cannot credit any one of the particulars which he alleges, and must regard his claims as "not proven."

Morrell subsequently offered his services to the French government for D'Urville's expedition of 1837, but they were not accepted, and he also importuned the Messrs. Enderby for employment, but Mr. Charles Enderby stated publicly that "he had heard so much of him that he did not think fit to enter into any engagement with him."

Captain Robert Johnson, who has been several times referred to, was one of the few Antarctic navigators who perished in those seas. He set out from New Zealand in 1826 with the intention, according to Morrell, of seeking new land between 60° and 65° S. south of that island, and was never heard of again. It might very possibly be that he penetrated the pack into Ross Sea, and was unable to make his way out.

The American sealers continued to visit the islands

112 SIEGE OF THE SOUTH POLE

bordering the Antarctic circle, though with the exception of Morrell, we have not found that any of them claimed to have crossed the magic line that bounds the Antarctic regions properly so-called. No doubt they accumulated much information that has been lost to us; because at that time no society existed in America which concerned itself with collecting and preserving records of exploration or of encouraging geographical research. The work was that of groups of individuals, amongst whom some were fully alive to the importance of scientific observation, though to most the seal was more interesting than the land it lived on.

The Antarctic summer of 1829-30 saw Captain Pendleton in the brig *Seraph*, and Captain Palmer in the brig *Annawan* once more in the South Shetlands and cruising to the north and west of Palmer Land. On this occasion, they were accompanied by two scientific men, Mr. J. N. Reynolds and Mr. Watson, to whom the possibilities of research in the vast unknown area on whose verge they were hovering, naturally appealed strongly. Mr. Reynolds states distinctly that several sealers had gone south of 70° S., had pursued their work on uncharted coasts, but declined from commercial motives to give any definite description of their discoveries. We are glad to learn that the old records and living memories at Stonington are being laid under contribution in order to produce what cannot fail to be a fascinating work, the full history of American sealers in the far south.

In 1833, Edmund Fanning presented a memorial to Congress "praying that a national discovery and exploring expedition be sent to the South Seas," and a strong effort was made to influence public opinion in the matter. The Americans felt that they had been first in

the field and they saw that they were in danger of losing the credit of making new discoveries, for a formidable rivalry in their sealing ventures had sprung up. J. N. Reynolds helped forward the cause in which he was keenly interested, and in the course of an address to Congress in 1836, he referred to the "extensive group of islands lying north of the coast of Palmer's Land, the extent of which neither we nor any subsequent navigators have as yet ascertained; though a British vessel touched at a single spot in 1831, taking from it the American and giving it an English name."

CHAPTER VI

BELLINGSHAUSEN'S ANTARCTIC VOYAGE

"To reside
In thrilling regions of thick-ribbed ice;
To be imprisoned in the viewless winds
And blown with restless violence round about
The pendent world."

—SHAKESPEARE.

WHEN the fog lifted from the deck of the little Hero in Bransfield Channel one morning in 1821 the worthy Nathaniel B. Palmer of Stonington, Connecticut, gazed, we are told, with very natural surprise on two Russian men-of-war which loomed above him out of the darkness. They appeared without notice and after the momentary intercourse with the sealers of Yankee Harbour they disappeared without a trace for many a day. Even now the volumes which conceal the facts of the cruise in the Russian language remain without a full published translation into any tongue of western Europe, and it was many years before even a summary of the log of the expedition became known to sailors. The excellent abstract in German published by Professor Gravelius in 1902 gives the only really satisfactory account yet accessible of one of the greatest Antarctic expeditions on record, a voyage well worthy of being placed beside that of Cook, the only precursor in those waters.

Early in 1819 the Emperor Alexander I., probably acting on the advice of Baron de Traversey the head of

the Russian Admiralty, resolved on a scheme of polar exploration on a truly imperial scale. He decided to send out two expeditions simultaneously to explore the two polar regions each consisting of two ships of the Russian navy under the command of naval officers. The arrangements were carried through with all the speed and thoroughness that an absolute monarch could command, and there is no doubt that the project of exploration was very warmly cherished by the Tsar, whilst Baron de Traversey threw himself heart and soul into the work of equipment. Everything was far advanced before the commanders of the four ships were finally appointed.

The supreme command of the southern expedition was given to Commodore Rashmanoff, a celebrated Russian sailor who had served under Krusenstern on his voyage of circumnavigation. But the commodore had had the misfortune to lose his ship on the Skaw, and was waiting in Copenhagen for the return of summer before making the journey to St. Petersburg. On receiving his orders he excused himself on the plea of shattered health and physical inability to undertake so laborious and responsible a command, but he recommended for the post his old comrade with Krusenstern, Captain Bellingshausen then in command of the frigate *Flora* in the Black Sea.

Fabian, or perhaps more correctly Thaddeus, von Bellingshausen, was born in Oesel, the island which lies across the mouth of the Gulf of Riga, in the year 1778. He was thus forty-one years of age when chosen for the command. On May 5th, Bellingshausen received a peremptory order to report himself at St. Petersburg to receive the Emperor's instructions, and making all haste from Sevastopol he reached the capital on June 3rd and received the appointment to command the expedition.

116 SIEGE OF THE SOUTH POLE

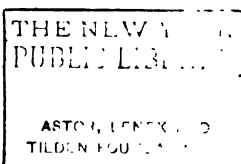
The ships had already nearly completed their preparations for sea, and lay at Cronstadt where the new commander had scarcely six weeks at his disposal before setting out. He was personally to command the *Vostok* (Orient) a corvette barely 130 feet long and of almost 33 feet beam, built of pine at St. Petersburg the previous year, and specially sheathed in copper below water. The moment Bellingshausen saw the lofty masts and slender spars of his ship he gave orders for them to be cut down, the sail-area diminished, and the ship rigged and strengthened for rough weather.

The second in command of the expedition, who had received his commission on April 5th, was Lieutenant Lazareff, a promising officer who had served as a volunteer for four years in the British navy and then, entering the Russian service, had commanded a ship of the Russian-American company and had circumnavigated the world on his voyage to Alaska and back. His ship was an old Baltic trader, the *Ladoga*, of 530 tons, 120 feet long and of 30 feet beam, also built of pine and specially strengthened for the cruise. Lazareff had her masts reduced and other changes made, and the Emperor issued a decree changing her name to *Mirni* (Pacific); but Bellingshausen observed drily that despite the change of name any naval officer could see at a glance that she could never keep pace with the *Vostok*. As a matter of fact the leading ship had to make almost the whole voyage under shortened sail in order not to run away from her clumsy consort. While the repairs were being carried out with feverish haste Bellingshausen had a hard time of it selecting his officers and crew. The number of candidates was so great that the selection proved extremely difficult but at last the requisite reduction of the



Admiral Bellingshausen.

(From a Portrait in the Library of the Imperial Naval
Department in St. Petersburg.)



list was made. Eventually the Vostok's complement consisted of the captain, four lieutenants, a midshipman, an astronomer, an artist, a surgeon, various warrant officers and servants, 14 naval artillery men and 71 sailors, a total number of 117 men. The Mirni carried a captain, two lieutenants, two midshipmen, two warrant officers, a surgeon, seven artillerymen and 44 sailors, the total number being given as 72. To this total we must add a chaplain, for frequent references are made to a priest who sailed on the Mirni, though his name is not given in the list.

The provisions were very carefully selected and as proof of their quality Bellingshausen points to the excellent health of the expedition and the absence of scurvy. The staple food was salted meat, some of which was brought back in excellent condition after two years in all climates. Biscuits, sauerkraut and a small quantity of condensed soup are the only other articles of food mentioned. Special attention was paid to the provision of abundant warm clothing for the men, and the wages were fixed at eight times the usual amount, while an extra year's pay was given to all ratings on their return. The expedition was in fact planned throughout on the most generous scale. Two German naturalists were selected to accompany the ships and appointed to join at Copenhagen on July 23rd.

On July 5th the Emperor visited the ships in Cronstadt and next day entertained the commanders at Peterhof, impressing upon them his desire that they should act in the most friendly manner possible towards every one they might meet, and in particular that they should never use their weapons against any savages except in the uttermost need.

118 SIEGE OF THE SOUTH POLE

The two expeditions sailed from Cronstadt on July 15th, 1819, the *Vostok* and the *Mirni* leaving first, bound for the farthest south to supplement the voyage of Cook; the *Otkritie* and *Blagonamerennii* following, bound for the farthest north with the special task of making the North West Passage from Bering Strait eastward.

The Antarctic expedition reached Copenhagen on July 25th, when Bellingshausen and Lazareff landed to pick up their German naturalists and lay in a supply of rum, wine and vinegar for the cruise. The latter purpose was speedily effected, but the naturalists did not appear. They wrote explaining that a long voyage demanded much time for preparation, that they found the time insufficient and so were sorry that they could not come. A desperate effort was made to find Danish substitutes but in vain. Bellingshausen says: "We have lamented during the whole course of the voyage and still lament that two Russians were not selected to carry out the natural history work of the expedition, as we had wished at the beginning instead of depending upon unknown foreigners." Vice-admiral Lewenören, a Dane, who was "no friend of the English" warned the captains against placing any reliance on the British Admiralty charts or the Nautical Almanack, the errors in which he assured them were the cause of many shipwrecks. However Lazareff had his four years of service in the British navy to judge by; and the two ships made their way straight to Portsmouth to complete their equipment of charts and nautical instruments. On August 9th the *Vostok* anchored in Spithead, and three days later the two captains took coach for London to purchase charts, chronometers and sextants. The want of naturalists weighed heavily on Bellingshausen, the Emperor's plan was made imperfect by it, the

full success of his voyage imperilled; and in the hope even at the eleventh hour of filling the vacancies he obtained an introduction to the President of the Royal Society, the venerable Sir Joseph Banks, the old friend and companion of Captain James Cook.

All the enquiries were unavailing and the Russians returned to Portsmouth, whence after having completed their stores and waiting, hoping against hope for naturalists to be found the ships set sail on September 5th. They touched at Tenerife and Rio de Janeiro, meeting the Russian Arctic expedition outward bound at the latter port, and then a straight run down the South Atlantic brought South Georgia into sight on December 27th. Two British sealing vessels were found at work here; a running survey was made of the south coast to supplement Cook's work on the north, and two small off-lying islets were given Russian names. Half way to the South Sandwich Islands a sounding was made in 260 fathoms with no bottom, and a temperature observation at that depth gave 31.8° F.

The first ice-island was met in 56° S. towering out of the water for 180 feet and alive with penguins. The Russian sailors gazed with amazement at a sight soon to become the most familiar of every day appearances. Whales were observed in great numbers, and albatrosses escorted the ships on their way to the south. The first discovery was made on January 3rd, 1820, when a group of three small islands was descried a short distance to the north of the Sandwich group. It was appropriately named after the Russian Minister of Marine, Baron de Traversey. One of the islands named after Savadoffski, the first officer of the Vostok, was an active volcano rising into a fantastic summit and emitting thick clouds of

120 SIEGE OF THE SOUTH POLE

vapour. A landing was made, and the ground half way up the mountain was found to be quite hot. One side of the island was free from snow in consequence and was entirely covered with penguins which seemed to be revelling in so genial a nesting place. •

Bellingshausen employed a considerable part of his time in making scientific experiments, he tested a new deep-sea water-bottle with an enclosed thermometer and satisfied himself that the water at 200 fathoms was colder and salter than on the surface; he sent out boats to chip off pieces of the floating ice and melted it to see if the resulting water could be used for making tea; and as the nights grew colder he studied the formation of ice in salt and fresh water.

The Russian ships made their way southward just to the east of the Sandwich group recognising Candlemas, Saunders and Montague Islands, which Cook had seen from the west, and favoured by a solitary day of brilliant sunshine the snow-swathed mountains made a splendid spectacle. Fogs and snow-squalls speedily reasserted their sway and the icebergs became more numerous and the sea was so rough that on January 12th, the officers of the *Mirni* were unable to come on board the *Vostok* to celebrate the Russian New Year's Day. Next day Southern Thule was seen and just after crossing the parallel of 60° S. the ships were confronted by the edge of a solid ice-pack which compelled them to turn west and then north, passing the islands of the South Sandwich group again on the west side and so enabling the positions to be fixed. It was a trying experience, the first of many in which the ships had to beat against a gale through a sea encumbered by ice-islands, and the relief of being able to hold a steady course for a few hours on January

16th, is described with a warmth of feeling that helps one to realise the previous toil and anxiety. An easterly course was held until the 22nd to the south of Cook's homeward track, and then the pack became less close and a slight swell running from the south betokened an open sea in that direction.

The parallel of 60° was crossed in 8° W., and the wind shifting made it possible to turn southward round the edge of the pack. No other ship had ever entered this region, and Bellingshausen hoped to discover land or at least to make a high latitude. He crossed the Antarctic circle on January 26th, in 3° W. and next day reached $69^{\circ} 21'$ on the same meridian. Close ice now barred the way; three days were spent in working round a small projection of it and on January 30th there seemed at last to be a clear lead to the south, little ice being in sight and whales blowing all round. The ships were thickly covered with soft snow and the temperature of the air had fallen below 30° F. On February 1st all progress was barred by the ice in $69^{\circ} 25'$ S. and $1^{\circ} 11'$ W. A northeasterly course brought them north of the circle again on the 5th, and the eastward course was resumed as far south as the ice permitted and about five degrees to the south of Cook's outward route on his vain search for Bouvet Island. It was soon possible to turn southward and Bellingshausen crossed the circle southward for the second time on February 14th in 18° E., reaching $69^{\circ} 6'$ S. on the 16th. The air-temperature had fallen to 23° F. and the sea was full of pack-ice while snow and fog alternated with heavy gales. It was impossible to go farther and a northeasterly course had to be shaped which carried the vessels beyond the circle on the 19th, in 21° E. a point due south of the Cape of Good Hope.

122 SIEGE OF THE SOUTH POLE

The Russians might have been excused had they ceased from their efforts at this point but Bellingshausen sailed east, south of latitude 65° for 20 degrees of longitude and then succeeded in crossing the Antarctic circle for a third time in 36° E. reaching $66^{\circ} 53'$ S. in 41° E. This was an important point, for here Cook had made his first crossing of the Antarctic circle forty-seven years before, had reached the same latitude and had been driven back by just such an impassable barrier of ice. The variation of the compass was found to have increased nearly 11° westerly since Cook's time. Since leaving the South Sandwich Islands the Russian ships had kept south of Cook's track and pushed the limits of human knowledge far to the southward of any previous explorer. The appearance of birds again suggested the vicinity of land, and had Bellingshausen been able to keep along the Antarctic circle in clear water for a day's sail to the eastward he would probably have discovered Enderby Land. On the 26th, however the worst storm of the voyage descended suddenly on the ships; decks and rigging were covered thick with snow, terrific seas broke over the vessels and the greatest anxiety was felt as to the result. The gale lasted for three days from north and north-northeast, the furious snow-squalls hid the drifting bergs which only loomed up as the ships were almost upon them. The one hope of safety was to beat to the north into clearer seas, but every rope and spar was crusted an inch and a half thick with ice making it almost impossible to work the sails, and it was little less than a miracle that both ships emerged still in company and without having suffered any serious damage.

At this point it will be remembered Cook had run to the northward of the fiftieth parallel in order to search

for the islands reported by Marion and had thus left a vast stretch of the Antarctic area untraversed. No sail had been in those seas since and Bellingshausen again had the honour of being the first to follow the edge of the ice-pack in latitudes of from 63° to 60° for nearly 45° of longitude, one-eighth of the circumference of the Earth. In all this stretch of unknown ocean nothing was seen except occasional floating ice, and gradually turning toward the north the Vostok and Mirni passed the sixtieth parallel on March 16th in 87° E. close to the point where Cook had crossed it southward on his return from the northern detour. A few days previously Bellingshausen had celebrated his hundredth day out from Rio de Janeiro with immense satisfaction because the crews of both ships were in the best of health; but supplies were running low and it was becoming important to seek some harbour where they could be replenished. On March 15th an enormous iceberg had been seen the height of which was given by two sextant measurements as 375 and 408 feet.

Bellingshausen now resolved to quit the ice and divide his forces for the voyage to Sydney so as to explore more thoroughly the sea south of Australia. The two vessels were to meet again either at Royal Company Island (which neither vessel could find for the best of reasons), or in Sydney Harbour. As the ship's company of the Vostok was by far the more numerous Bellingshausen thought it right to take the priest on board so that as he could no longer minister to both crews he might at least have the benefit of the larger congregation.

Then for the first time since she outpaced the Mirni in crossing the North Sea the Vostok spread her full can-

124 SIEGE OF THE SOUTH POLE

vas and made speed to port, dropping anchor in Sydney Harbour on March 29th, 1820, 131 days out from Rio.

The two ships *Otkritie* and *Blagonameranii* were found here again, having got no farther on their leisurely voyage to Bering Sea. The young colony of New South Wales gave a most hearty welcome to the Russian officers, and Bellingshausen very handsomely acknowledges the kindness he received from the governor General Macquarie and the leading citizens of Sydney and Paramatta. The governor drove the officers out to see the new lighthouse on the South Head on April 18th, an auspicious day, for as they approached the lighthouse they saw the *Mirni* glide into the harbour with all well on board.

The two ships remained in port undergoing a very necessary overhaul only until May 19th, for the objects of the expedition were not exclusively polar, and the Russian commodore and his crews spent the southern winter of 1820 in cruising through the tropical archipelagoes of the South Pacific. The Paumotu group, not yet fully charted after the lapse of more than eighty years, was then scarcely known and amongst those islands the *Vostok* and *Mirni* spent much of their time. A bag of seventeen new islands rewarded the mighty hunters of the expedition. An interesting visit was also paid to Cook's only place of refreshment Tahiti, where the chief Pomare and the English missionaries received them with graceful hospitality.

The ships were back in Sydney Harbour on September 19th, and there the Russian consul informed Bellingshausen of the discovery of New South Shetland by William Smith in 1819, a fact of some little importance as bearing on the authenticity of Fanning's account of the visit of the Russian expedition to Deception Island to



The Vostok and Mirni off Macquarie Island.
(From Bellingshausen's *Atlas*.)

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which reference has already been made. The Vostok and Mirni quitted Sydney on November 11th, 1820, and a fortnight later they reached Macquarie Island where they experienced the shock of a submarine earthquake while in 50 fathoms of water. On December 7th, they crossed the parallel of 60° S. in 163° E. at dinner-time, and the officers drank a toast to their friends at home in latitude 60° N. They remained south of that parallel for the unprecedented distance of 145 degrees of longitude and for a period of no less than two months and three days.

The first ice was met on December 8th in $62^{\circ} 18'$ S., a stately berg 80 feet high and a mile in circumference, its sides carved by the weather so that it looked like a cathedral wall enriched with statues; and from that time onwards the vessels never lost sight of the ice until they left South Georgia behind them on their homeward voyage. The advance guard of icebergs was soon succeeded by heavy pack ice in which many huge bergs were frozen, one of them more than five miles in circumference being at first mistaken for land. Along the edge of this pack they cruised south of New Zealand, where had they been a month or so later and had their course been directed southwest instead of southeast they might have anticipated the great discoveries of Ross. It is interesting to note that at this point Bellingshausen takes some pains to explain why he did not enter the pack and push southward, his reason being that his ships were too weak to stand any severe ice-pressure. The region had been avoided by Cook, hence the anxiety of his successor to attain a high latitude in it.

As the ships proceeded the ice thickened and at one time more than a hundred majestic bergs were in sight. It was necessary to make a detour to the northward to

126 SIEGE OF THE SOUTH POLE

get round the edge of the pack, which was followed for a distance of 380 miles, and just when the end of it seemed to be reached and open sea appeared to south and east, allowing a southerly course to be set, a frightful storm came on. To add to the misery of the gale and the darkness the wild rolling of the ships shook masses of frozen snow from the rigging which fell on the decks making it doubly dangerous to attempt to move about. The pet birds brought from the tropics were dying daily, but the denizens of the region of ice and storm came round the ships in increasing number, always renewing the hope of land not far beyond the barrier ice. On December 24th the vessels for the fourth time succeeded in getting within the Antarctic circle in $164^{\circ} 34' \text{ W.}$; but the high latitude could only be maintained for two days a dense pack set with gigantic bergs put a stop to all advance, one of the ice-islands being found to measure over eleven miles in length. A wide northward curve had to be made keeping outside the edge of the pack through the same part of the ocean where Cook nearly a fortnight later in the same month of 1773 had sailed for thirteen degrees of longitude south of the circle. Bellingshausen just managed to get round the pack without going north of 60°S. , and on the meridian of 135°W. , where Cook had been driven north with his exhausted crew, he succeeded in getting south again. On Christmas day (Russian calendar) 244 icebergs were sighted, and the commander congratulated himself that both crews were enjoying the best of health, far better than in the tropics. On January 11th the circle was crossed for the fifth time to $67^{\circ} 50'$ in 120°W. Here the pack again presented too formidable a front to face, and the two war ships had once more to make an honourable retreat, but not for

long. Doubling the northern projection of the ice, Bellingshausen deliberately passed the meridian where Cook had made the farthest south of his voyage, feeling it was his duty to explore the unknown rather than to follow where another had led. Keeping on a southeasterly course he crossed the circle southward for the sixth time in 103° W. and sailing straight on through a crowd of huge ice-islands was brought up by a solid wall of ice. This was the most southerly point reached on the voyage, $69^{\circ} 52' \text{ S.}$ in $92^{\circ} 10' \text{ W.}$; it was attained on January 1st, 1821.

The risk of being surrounded and imprisoned in the drifting ice was becoming serious and the ships were sailing northward along the edge of the pack when a dark speck appeared on the white background of ice to the east. Every telescope was turned upon it and various opinions were being expressed when the sun suddenly shone out and revealed it as undoubted land, the steep cliffs standing out black, bare and unmistakable. Since leaving the Macquarie Islands the only solid objects to meet the eye had been ice in its multifarious forms of berg and floe and pack, but now an island loftier than any berg had come into view. It lay in latitude 69° S. , longitude 90° W. , the most southerly land yet discovered, and when on January 22nd the ships came as near the land as the ice permitted, its length was found to be about nine miles, its breadth four miles and its height was estimated at 4000 feet. The island rose abruptly from the ice-covered sea and, except for the cliffs and the higher slopes, was entirely swathed in snow. It stood as a silent and inaccessible outpost of the known world, the only land ever yet discovered within the southern circle. Bellingshausen named it Peter I. Island in memory of the great

128 SIEGE OF THE SOUTH POLE

Tsar who had rescued Russia from its frigid isolation and thrown the world open to his country. The sea was much discoloured, and the other indications of land familiar to Antarctic voyagers were present in abundance so that Bellingshausen was convinced that he was on the threshold of some more important discovery; "the land *must* come" he wrote.

Keeping as far south as possible, close on the edge of a heavy pack, Bellingshausen held to the east and on January 28th, another high land came into view; this time a coast of considerable extent with a well marked cape, the position of which was fixed as $68^{\circ} 43' \text{ S.}$, and $73^{\circ} 10' \text{ W.}$ The weather was fortunately fine, in fact it was the most beautiful day of the whole Antarctic voyage, and the air was so clear that although the ships could not approach within 40 miles of the land, it could be seen distinctly and some parts appeared free from snow. The land seemed to extend a long distance toward the southwest, and it was named Alexander I. Land, after the reigning Tsar.

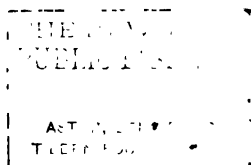
It was impossible to follow up the discovery. The insistent pressure of the ice forced the ships back to the northwest, and when an easterly course could be resumed they crossed the circle northward in 76° W. on January 31st, after having sailed within the Antarctic circle for a fortnight over a continuous stretch of 28 degrees of longitude, an unprecedented achievement. From this point the Russian ships made straight for the South Shetland islands in order to see whether there was any connection between them and the "conjectured Antarctic Continent." Land was seen on February 4th, and identified as the South Shetlands. Bellingshausen sailed along the south of the group and gave many Russian or at



Peter I Island.



Alexander I Land.
(From Bellingshausen's *Atlas*.)



least anti-French names such as Yaroslav, Waterloo, Borodino, Smolensk and Leipzig to several of the islands, but these have not been retained as the group had already been charted by Bransfield and Weddell. At Yaroslav Island he says that he met a fleet of eight British and American sealers lying at anchor on February 5th, and the romantic meeting with the Americans so dramatically described by Fanning is dismissed in the words "The American captain, Palmer, whom we invited to see us, told of the really prodigiously rich booty which was made here of sealskins." On which the Russian captain predicts the early extermination of the seals.

After crossing the sixtieth parallel on February 11th, and passing through the South Orkneys the two ships completed their circumnavigation off South Georgia. After an anxious night near the Shag Rocks in a fog, they bore up for Rio, stayed there from March 9th to May 4th, and reentered the harbour of Cronstadt on July 5th, 1821 after a magnificent voyage of two years' duration with the loss of only three men, a death-rate very much smaller than that prevailing in Russia. Of the 751 days they had been afloat 527 days had been passed under sail.

It is an exceedingly unfortunate circumstance that so little has ever been known outside Russia of Bellingshausen's great exploit. The voyage was a masterly continuation of that of Cook, supplementing it in every particular, competing with it in none. The occasional measurements of temperature and salinity in the water, and the acute observations on the formation of sea-ice would have been very useful to later explorers. But unfortunately until 1902 no Antarctic expedition had been furnished with details of the Russian work

130 SIEGE OF THE SOUTH POLE

though the track of Bellingshausen's ships is laid down on the South Polar charts.

This track alone is very instructive, for though it shows that Cook's highest latitude was not equalled by a degree and a quarter, it shows also that the Vostok and Mirni sailed over 242 degrees of longitude south of 60° S., of which 41 degrees of longitude were within the Antarctic circle; while the Resolution and Adventure made only 125 degrees south of 60° S., and 24 degrees south of the circle. Not only so, but Bellingshausen's care in crossing all the great gaps left by his predecessor demonstrated beyond any doubt the existence of a continuous open sea south of the parallel of 60°.

On his return Bellingshausen wrote a full account of the voyage which was not published for several years and then only in Russian. He continued to serve in the navy and rose to the rank of Admiral in 1831. Eight years later he received the onerous appointment of Port Captain and Governor of Cronstadt, the impregnable fortress that guards the entrance to the Neva. In that town he died in 1852, and there his memory is perpetuated by a bronze bust set on a granite pedestal in one of the tree-lined avenues,

CHAPTER VII

WEDDELL'S FARTHEST

"Give these, I exhort you, their guerdon and glory
For daring so much, before they well did it,
The first of the new in our race's story
Beats the last of the old; 'tis no idle quiddit."
—ROBERT BROWNING.

REFERENCE has already been made to Enderby's ships and the rediscovery of Bouvet Island in 1808, as well as to the discovery of the South Shetlands in 1819 by a British ship, though she was trading at that time between foreign ports. We have now to follow up the consequences of this discovery in the old country, and to introduce an interesting personality who contributed much to the story of the Antarctic.

James Weddell, the son of a Lanarkshire upholsterer, settled in London, being left an orphan at an early age, was bound apprentice on board a coasting vessel, probably a Newcastle collier. In 1808, after sailing in a merchant ship trading with the West Indies for three years, he resented some action of his captain and knocked him down. The captain accordingly, judging him unfit for the merchant service, handed him over to a man-of-war, as a subject for discipline. At that time when men were scarce any recruit was welcome and Weddell commencing under such bad auspices nevertheless earned for himself a character which makes one suspect that his old captain fully deserved the treatment he received. Weddell was soon rated as midshipman and then as Master,

132 SIEGE OF THE SOUTH POLE

with which rank he was paid off in 1816 when the strength of the navy was reduced at the close of the war.

When the news of the discovery of the South Shetlands became known in 1819 Weddell accepted the command of the brig *Jane* of Leith, a sealer of 160 tons, and started for a sealing cruise in the southern seas. On this first voyage he commenced the exploration and survey of the South Shetlands, and he was the first mariner from Great Britain to visit them. He seems to have also discovered the South Orkneys on the same voyage, not knowing of the previous discovery by Powell, and he made a most thorough search for the Aurora Islands midway between the Falklands and South Georgia. He found no land whatever in that region and suggested that what gave rise to the report and misled the officers of the *Atrevida* must have been icebergs drifted around and adherent to the Shag Rocks, which when thus encased presented the appearance of snow-covered islands with rocky prominences.

A second cruise followed in which Weddell had, as well as the *Jane* under his own command, a cutter of 65 tons named the *Beaufoy* of London, under Matthew Brisbane, the two vessels sailing together and keeping within sight with few and short exceptions during the whole long and difficult voyage. The vessels were provisioned for two years and carried twenty-two men all told on the *Jane* and thirteen on the *Beaufoy*. Particular care was given to the nautical instruments, but although Weddell had scientific leanings he does not appear to have had any scientific equipment, nor did his vessel follow the usual custom of the Arctic whalers in carrying a surgeon.



James Weddell.

(From a Painting in the Library of the Royal Geographical Society.)

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The two little craft left the Downs on September 17th, 1822, touched at Madeira on October 4th, at Bonavista in the Cape Verde group on the 14th, to take in a stock of salt, and crossed the equator on November 7th. A week later Weddell spoke and boarded a Portuguese slaver carrying 250 slaves and bitterly regretted that he had no legal right to make a prize of her and liberate her wretched cargo. His ship appears to have been armed, for he says he had force enough to take the slaver, and his officers urged him strongly to do so, but he felt he could not lay himself open to a charge of piracy, so the slavers escaped and the slaves remained captive. Several stoppages were made on the Patagonian coast for the purpose of getting water, shooting guanacos for meat, repairing damage to the *Jane*, and making surveys of some harbours, and on the 12th of January, 1823, the South Orkneys were sighted, and some time was spent in surveying them. The centre of Saddle Island was fixed as in $60^{\circ} 38' \text{ S.}$ and $44^{\circ} 53' \text{ W.}$ Here Weddell captured some sea-leopards, one of the skins of which presented by him to the Edinburgh Museum was examined and described by Professor Jamieson and was the first specimen to be studied scientifically in Europe. Though grotesquely stuffed, and still more grotesquely figured in Weddell's book it remains as the type specimen in the Museum at Edinburgh to this day.

The South Orkneys are described as even more rugged and dreary than the South Shetlands. A few patches of coarse grass formed the only vegetation visible, and the fogs which usually hung over the land did not make it more attractive. On January 22nd the vessels sailed for the south, keeping close together, the cutter on the windward quarter of the brig, to avoid separation in

134 SIEGE OF THE SOUTH POLE

the fog. The constant heaving-to when the weather became too thick and the manœuvring to avoid floating ice made the progress "very teasing and unprofitable." By the 27th the ships had reached $64^{\circ} 58' \text{ S.}$ in $39^{\circ} 40' \text{ W.}$ looking for new islands which might harbour seals; but finding none they stood northward in the same longitude and then, wishing to avoid known land and the tracks of former expeditions, turned back to the southeast. A reward of £10 was offered to the man who first saw land and many were the disappointments which resulted, for fog-banks, icebergs and once even a dead and much inflated whale gave rise to claims which a second glance disallowed.

Weddell refers to the extremely narrow escape which Cook had of discovering both the South Orkneys and the South Shetlands; but nothing in the history of marine exploration is more remarkable than the way in which ships looking for new land have passed just out of sight of great masses and archipelagoes, while ordinary seafarers hoping for nothing but a clear sea-way have lighted upon islands and even continents which to them were mere obstacles. On February 4th, being then within 100 miles of Sandwich Land, Weddell proposed to Brisbane to stand as far south as they could go in the hope of finding some entirely unknown land, and that officer readily assenting, the two little vessels set off on the most interesting exploit of the voyage. Everything possible on such small craft was done for the comfort of the men, but the decks were always wet and the sailors suffered badly from "colds, agues and rheumatism." As to diet Weddell says:

"I had allowed them three wine-glasses of rum a day per man, since we were in those seas; and their allow-



1. (From Weddell's "Voyage Towards the South Pole.")



2. (From the British Museum Reports on the Southern Cross Collections.)

Weddell's Seal—*Leptonychotes Weddelli*.

1944
1945
1946

ance of beef and pork was one pound and a quarter a man per day; five pounds of bread, two pints of flour, three of peas and two of barley a man per week. These allowances in a cold climate were rather scanty, but the uncertainty of the length of our voyage required the strictest economy."

Observations were made daily at noon whenever the sun appeared, and as Weddell had provided four of the best chronometers available for his own ship and was an expert in navigation his longitudes as well as his latitudes may be trusted. He also made a point of observing and recording the temperature of the air and water and the variation of the compass each day.

On February 6th and 7th about latitude 64° S. many ice islands were encountered, one of them estimated at two miles in length and 250 feet high. The wind blew from a westerly quarter and the weather was alternately foggy and clear, the temperature of the air at 8 p. m. was 34° and that of the water 36°. Early on the morning of the 10th the mate of the *Jane* reported land in sight, and Weddell himself on seeing a dark sugar-loaf shaped object believed it to be a rock and expected to find the *terra-firma* beyond it; but on making up to it and passing within 300 yards it was found to be merely the pinnacle of an iceberg so thickly incorporated with black earth as to present the appearance of a rock, an illusion strengthened by an island of clear ice from which it was "detached above water though connected below." The wind shifted to the south and blew a gale, a strong northwesterly current was running and the sailors began to grumble in their disappointment, for their wages were a proportion of the value of the catch and a new land meant a big haul of seals and increased pay. The position was just on the

136 SIEGE OF THE SOUTH POLE

Antarctic circle and there was some temptation to return; but Weddell arguing that the earth on the berg must have come from some land to the south held on his course against both wind and current. Ice-islands were numerous; for days over fifty were always in sight, and the effort to avoid them made so many changes of course necessary that it was very difficult to keep account of the position by dead reckoning.

By the 14th of February, 1823, the high latitude of 68° was attained, and on the 16th the ships crossed the seventieth parallel going south. A great number of birds "of the blue petrel kind" kept in sight and also "many hump- and finned-back whales." Here a disaster occurred in the breaking of the only two thermometers on board so no more observations of temperature could be taken; but Weddell states that the weather was certainly not colder than that of midsummer (December) in latitude 61° S. The rapid changes in variation puzzled the leader greatly, he compared all the compasses on board but could find no material difference between them though they were rather sluggish in action. On the 18th in 73° S. the weather was beautiful, not a particle of ice of any description was to be seen, many whales were about the ships and the sea was "literally covered with birds of the blue petrel kind." The carpenter was repairing a boat, the sailmaker was mending the sails; it was altogether a picture of summer at sea.

During the night of the 19th it fell calm, but on the morning of the 20th it blew fresh from south by west:

"The atmosphere now became very clear, and nothing like land was to be seen. Three ice-islands were in sight from the deck, and one other from the mast-head. On one we perceived a great number of penguins roosted.

Our latitude at this time, 20th February, 1822* was $74^{\circ} 15'$, and longitude $34^{\circ} 16' 45''$; the wind blowing fresh at south, prevented what I most desired, our making farther progress in that direction. I would willingly have explored the S. W. quarter, but taking into consideration the lateness of the season, and that we had to pass homewards through 1000 miles of sea strewed with ice islands, with long nights and probably attended with fogs, I could not determine otherwise than to take advantage of this favourable wind for returning.

"I much regretted that circumstances had not allowed me to proceed to the southward, when in the latitude of 65° , on the 27th of January, as I should then have had sufficient time to examine this sea to my satisfaction.

"Situated however as I actually was, my attention was naturally roused to observe any phenomena which might be considered interesting to science. I was well aware that the making of scientific observations in this unfrequented part of the globe was a very desirable object, and consequently the more lamented my not being well supplied with the instruments with which ships fitted out for discovery are generally provided."

In these simple words, which may profitably be compared with Morrell's rhapsodical utterances when he claimed to be in a similar position, Weddell shows himself at his best. The similarity in sentiment and diction with Cook is interesting; and enforces the similarity in the birth, training, and naval experience of the two men. It must be remembered that Weddell was

*This misprint for the correct date 1823 is significant in showing that Morrell followed the text of Weddell's book and did not speak from actual knowledge of his cruise. The map in the volume gives the date as 1823.

138 SIEGE OF THE SOUTH POLE

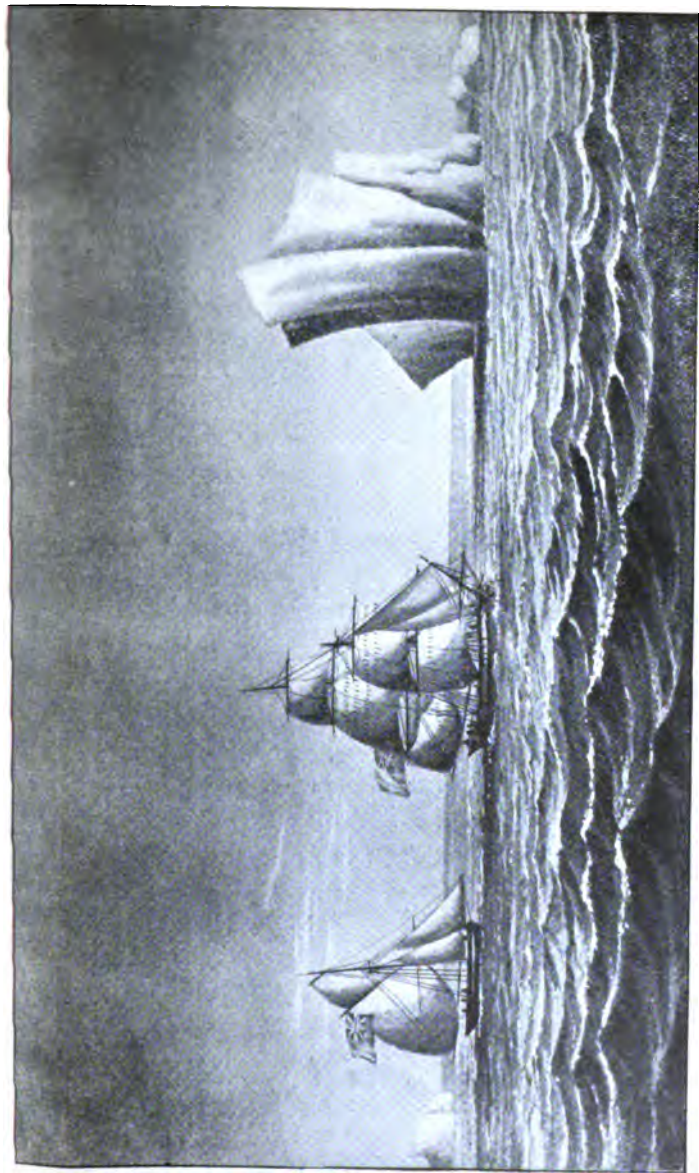
searching for seals not for the south pole and that his consort was a little vessel more like a pilot-boat than a sea-going craft. Neither vessel was protected in any way for ice-navigation and to be compelled to winter south of the circle would probably have been fatal to all on board. The men were but ill-clothed for bad weather and the supply of fuel and food was not sufficient to justify any serious risks being run. In similar circumstances Captain Cook would have acted in the same way.

Weddell looked out for the aurora australis, the sun being then below the horizon for six hours, but the twilight all night was too strong to allow it to be seen.

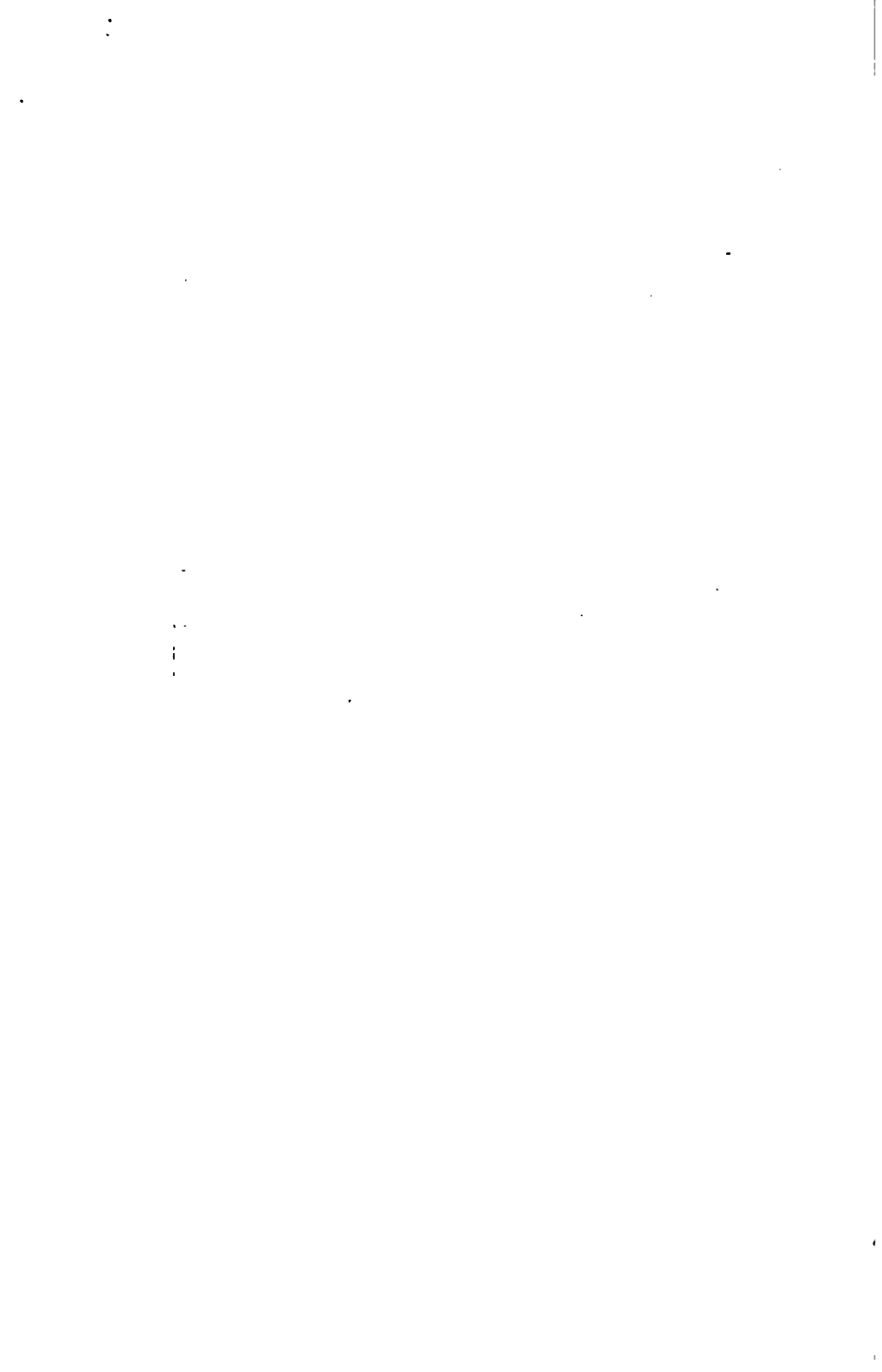
In order to cheer up his crew, whose repeated disappointments in finding the seals that were to pay their wages, was beginning to have a bad effect, Weddell made a little ceremony, hoisting colours and firing a salute in honour of their having accompanied him to the farthest south point yet attained, 214 nautical miles nearer to the pole than Cook had reached. The men gave three cheers, extra grog was served out and the sea was named after King George IV.; but the name has been changed and it is now more appropriately known as Weddell Sea in commemoration of its first navigator.

On returning northward various observations were made, a sounding with 240 fathoms, all the line on board, found no bottom. A bottle containing a paper stating the condition of the sea in 74° S. was thrown overboard to test the direction of the current, but it was never picked up.

As they proceeded northwards bad weather returned, with much snow and fog, and after crossing the position where a non-existent "South Iceland" was marked on the chart, the *Beaufoy* was separated from her consort.



The Jane and Beaufoy at Weddell's Farthest.
(From Weddell's "Voyage Towards the South Pole.")



Next day, March 7th, it blew a gale with a heavy sea that sent the brig racing at 10 miles an hour through the ice-laden water and enabled them to traverse the pack very quickly, though with great discomfort and constant danger. On the 12th the gallant little Beaufoy was found all well, and on the same afternoon both vessels cast anchor in Adventure Bay, South Georgia, a happy event after five months afloat, even though "it was not a country the most indulgent." It yielded, however, some green herbs which, though bitter, were useful in warding off scurvy, while young albatrosses could be had in abundance and formed excellent fresh meat, "not sufficiently firm to be compared with that of any domestic fowl."

On South Georgia Weddell was surprised to find that when he climbed to the top of one of the mountains to take an observation for latitude, the mercury in his artificial horizon kept in a state of such tremulous motion that he could not use it. It acted, in fact, as a seismoscope, showing that some volcanic activity still lurked in the island.

In the middle of April the two little vessels were off again, bound for the Falklands, and very heavy weather was encountered on the way. Weddell expresses his great satisfaction that some years before he had definitely proved the non-existence of the Aurora Islands, the risk of shipwreck on which would have been a very great anxiety. As it was the gale would have dismasted the brig had extra stays not been rigged, and the cutter lost her bowsprit by pitching into a heavy sea. The Falklands were not reached until May 11th, and here the winter was passed.

Leaving the Falklands early in October, 1823, the Jane

140 SIEGE OF THE SOUTH POLE

and Beaufoy sailed for the South Shetlands, and encountered very heavy pack ice in 62° S. Sometimes they skirted the edge of the pack looking for an opening, sometimes they tacked about in a pool of open water entirely surrounded by the pack and drifting rapidly to the eastward, and when at last, with infinite labour, the islands were sighted on October 28th, the ships were struck by a hurricane from the southwest, accompanied by bitter cold. Everything movable, including a whale-boat, was swept from the deck of the *Jane* and speedily, the deck, bulwarks, and lower rigging became a solid mass of ice; the rudder was frozen fast and could not be used, and the masses of frozen water on the fore-castle made the brig rise sluggishly to the sea. In spite of the danger thus occasioned, Weddell attributes his escape to the ice binding the ship together and preventing, as he put it, "the fastenings from being distressed." Many of the crew were hurt by being thrown down by the wild rolling of the ship, and nearly all were frost-bitten, for the clothing of the improvident *Jacks* was worn out, and many had not even a second pair of stockings or a shirt to change. The captain parted with everything he had to make good deficiencies. His blankets were cut up to make stockings, and the pump leather was used to patch the shoes. But no complaints were made, the men well knowing that if they went back to temperate seas without a cargo the form of "paying off" would take place without any money changing hands. The little cutter had stood the storm better than the brig, and both continued to struggle to reach the South Shetlands until November 17th, when, after having been in the utmost peril in the pack, they worked out in a sorely battered condition and made for Cape Horn. The vessels were far

too lightly built for ice work, their bottom planking being only two and a half inches thick. Weddell remarked that he had been in the Greenland seas and was well acquainted with the dangers of ice-navigation in the north, but that sailing among the ice in the south was accompanied by much greater risks because of the heavy westerly swell which keeps the ice in motion and never entirely subsides. The remainder of the summer was spent in sealing amongst the islands of Tierra del Fuego and not until May 1824 did the gallant little vessels return in safety to England.

There is nothing in Weddell's narrative, nor in what is known of the man, to lead us to doubt one word that he says. Recently an attempt has been made to cast discredit on his voyage to $74^{\circ} 15' S.$, because on returning home the chief officer of the *Jane* and two seamen made oath before the Commissioners of Customs as to the truth of the ship's log. This it has been argued suggested that the commander feared to be disbelieved and might have had some ground for his fears. It is much more likely that Weddell, knowing the tall talk indulged in by the ordinary run of sealers and the groundless tales they told, was resolved that his voyage at least should be placed authoritatively on a different platform.

It is impossible to admire this man too much for the way in which he spared neither pains nor expense to keep an accurate account of his route and to fix every position he visited. He shunned no danger in his slender little ships, and not only served the interests of his co-owners as a merchant, but also advanced the knowledge of the least-known part of the globe as only one who was at heart a man of science could. Weddell was fortunate in escaping serious accident, for it appears that during the three

142 SIEGE OF THE SOUTH POLE

years, 1820-22, at least seven sealing vessels were wrecked on the South Shetlands, and the crew of one of them was compelled to winter there in great destitution and misery.

When the land was so difficult of access except in the middle of the short summer, and the weather even during those few weeks so capricious and foggy, it is not surprising that very vague ideas prevailed as to the geography of the region to the south of the South Shetland Islands. That a large mass of land existed there was clearly understood. Fanning spoke of the "continent of Palmer's Land," which he believed did not extend farther than 100° W. longitude. Morrell spoke of the east coast of the land which Captain Johnson had named "New South Greenland," and Fanning states explicitly that this was Palmer Land, the first knowledge of which he had himself communicated to Johnson. Weddell in his track-chart sketches a vague "Trinity Land," but in a theoretical sketch-map of the circumpolar region he lays down a large mass of land south of the South Shetland Islands and gives to it the name of "South Shetland."

All that befell Weddell after his return we do not know, apparently he made other voyages to the south as a sealer. He was certainly absent from England in 1831 to 1833, and he died in London in the forty-seventh year of his age on 9th October, 1834. When Captain Biscoe reached Hobart Town in May, 1831, and again when he left it in October of the same year, he mentions a Captain Weddell as being there in command of the cutter *Eliza*, and there seems no reason to doubt that this was the hero of the voyage to 74° S.

Although Bouvet Island can no longer claim to be a

problem in Antarctic exploration, it is too old a friend to lose sight of, and the next incident to be chronicled is the visit of two more of Enderby's ships in 1825. This visit is described in the logs of the ships which were shown by Mr. Charles Enderby to Sir James Clark Ross twenty years later, and the similarity with Morrell's account may be taken either as strong confirmation of his alleged visit in 1823, or as proof of his having obtained and adapted an early account of the landing in 1825. The latter, we fear, is the more probable view.

On December 10th, 1825, Captain Norris of the *Sprightly*, with the *Lively* in company, came upon an island in $54^{\circ} 15' \text{ S.}$ and 5° E. , which he—apparently ignorant of the search so often made for Bouvet's Cape Circumcision—at once named Liverpool Island. An attempt to land was frustrated by a snowstorm. On the 13th, another island was sighted, and named Thompson Island, its position being given as $53^{\circ} 56' \text{ S.}$, $5^{\circ} 30' \text{ E.}$, and there were several rocks which were named The Chimnies. A landing was made on the 16th and the Union Jack hoisted on shore, but it is not stated on which of the two islands. Again on the 18th, a boat was sent out from each vessel to go round the island different ways, starting from the east end and meeting at the west end. Stormy weather came on and the boats, which had meanwhile landed, were unable to get back to their ships until the 24th. They returned when the weather moderated with the skins of forty-eight seals. The log states:

"We found by their report that seals are very scarce; and the isle is not likely to produce many, the S. W. point being the only place where they can make a landing, as the boats went entirely round the isle, and noth-

144 SIEGE OF THE SOUTH POLE

ing but perpendicular rocks could be seen; it bears evident marks of having been a volcano, as it is nothing less than a complete cinder, with immense veins of lava, which have the appearance of black glass, though some are streaked with white."

When Liverpool Island was first sighted the centre was seen to be covered with snow, but from the fact of its complete circumnavigation and no mention having been made of ice, it would seem that no glaciers reached the sea.

The work of the sealers may be interrupted for a moment to refer to a scientific expedition sent out by the British government for the purpose of carrying out observations on magnetism and the force of gravity in the South Atlantic. Sir Edward Sabine, who did more than any Englishman of his generation to advance the science of physical geography, had taken up the task of measuring the force of gravity by swinging pendulums at different parts of the Earth's surface, the only method known by which the true form of the surface of the globe can be ascertained. In pursuance of these researches the Admiralty sent out an extremely talented and thoroughly scientific officer, Captain Henry Foster, in command of H. M. S. *Chanticleer*, to undertake experiments in the islands of the South Atlantic. His instructions were to proceed to the most southerly known accessible land, the South Shetlands, and there make a complete series of pendulum and magnetic observations. Antarctic discovery was no part of the programme and the ship was not fitted for navigation in the ice. The *Chanticleer* went beyond the South Shetlands to a position in $63^{\circ} 43' \text{ S.}$, $61^{\circ} 45' \text{ W.}$, where Foster found land, went ashore and named Cape Possession. This appears to have been on

Hoseason Island, its earlier name possibly perpetuating the memory of some American sealer, who otherwise would be forgotten. The ship took up temporary headquarters in the vast crater of Deception Island, near the Yankee Harbour of the Stonington fleet, renamed Port Foster. Captain Foster's name deserves to be commemorated in the Southern Seas, for his early death before the voyage was concluded, was a loss not only to the Royal Navy, but to science. It would, however, have been more appropriate to attach his name to Cape Possession than to overshadow so quaint and interesting a landmark in the history of the Antarctic as the Yankee Harbour of the old New England skippers. From January 9th to March 4th, the Chanticleer lay in this safe and commodious harbour, while the observations were diligently carried on ashore, and then it was high time to make for the north to escape the on-coming winter. The medical officers of the ship studied the plant and animal life of this strange shell of an island, and one of them, the Dr. Webster who preserved for us the word portrait of Palmer with his basket of albatross eggs, also made some experiments on the floating of ice in seawater with reference to the phenomena of icebergs. A registering thermometer was left on the island so that the subsequent finder could tell the extremes of temperature which had been experienced.

CHAPTER VIII

ENDERBY BROTHERS AND THE ANTARCTIC

"We bring no store of ingots,
Of spice or precious stones,
But that we have we gathered
With sweat and aching bones:
In flame beneath the tropics
In frost upon the floe,
And jeopardy of every wind
That does between them go."

—RUDYARD KIPLING.

MESSRS. ENDERBY, whose ships had visited the Southern seas since 1785 and had already added something to geographical knowledge, began to take a deeper interest in Antarctic exploration from the time of the foundation of the Royal Geographical Society. Mr. Charles Enderby became an original Fellow of that Society in 1830 and remained actively interested in its work for forty-seven years. There is, perhaps, no other instance of a private mercantile firm undertaking so extensive a series of voyages of discovery without much encouragement in the way of pecuniary returns. It was in the palmy days of the deep-sea whalers, when hundreds of ships sailed for a cruise of a couple of years "round the world and back again" for a cargo of whale oil in tropical or temperate waters, as the chance of success suggested, and many shipmasters must have lighted on discoveries now lost to the world and perhaps never treated as more than sailors' yarns. Messrs. Enderby differed from other

merchants by the careful choice of their skippers, who were men of some education, and often of naval training. These were instructed to pursue discovery with a view to the advancement of knowledge as well as to pecuniary profit, hence the names of the owners as well as that of their skippers must always be honourably associated with the opening up of the dark and icebound margin of the South Polar region.

In 1830, Mr. John Biscoe, a retired Master in the Royal Navy, was sent out by the Enderbys on a sealing voyage in the brig *Tula*, with the cutter *Lively*, commanded at first by Mr. Smith and later by Mr. Avery, in company. On voyages of such length and danger it was felt that the dispatch of a single ship was inexpedient, and experience had shown, as in the case of Weddell's expedition, that a cutter was a handy and serviceable craft for working on the edge of the ice. In the landsman of to-day so small a vessel venturing into the remotest and the stormiest seas of the world, excites feelings of amazement, and we question if there are many in the navy, or even in the mercantile marine, who would care to sign on for a south polar voyage of two years' duration, in a fifty-tonner.

Attention had been called to the probability of land existing within the Antarctic ice by Captain Horsburgh, Hydrographer to the East India Company, who communicated a paper to the Royal Society in 1830, on the remarkable distance towards the tropics at which Antarctic ice was met with in 1828, some bergs having been sighted as far north as $35^{\circ} 50' S$. He argued that land must exist somewhere within the Antarctic region between the meridian of Greenwich and $20^{\circ} E.$, capable of

148 SIEGE OF THE SOUTH POLE

giving rise to huge icebergs, and he believed that the exceptional quantity of ice sighted in that year could be best accounted for by the occurrence of great earthquakes, which broke it off from the land. Thus Biscoe set out with some ground for looking for land and not merely fields of sea-ice in the far south.

Fortunately, Biscoe's log has been preserved, having been presented to the Royal Geographical Society by Mr. Charles Enderby, and the essential parts of it were published both in the English and French geographical journals of the period.

Biscoe's command left Gravesend on July 14th, 1830, and sailed from Berkeley Sound in the Falklands on November 27th, to carry out his instructions by visiting the southeast part of Sandwich Land. On the way he thought it advisable to cruise to the northward of the position assigned to the Aurora Islands by the Atrevida, so as to dispel any lingering suspicion of the possible existence of that troublesome group, Weddell's courses having lain to the southward. The search proved fruitless and the Auroras will trouble us no more.

On the voyage south the cutter was lost sight of in a fog on December 11th, and the Tula lay-to until noon in the hope that she would reappear. What made it worse was that the carpenter had gone aboard the smaller vessel to repair a boat two days before, and had not been able to return. It was a wretched day for Biscoe, for his barometer "burst of itself," and left him without a weather-glass; the brig then ran over something, probably only floating ice, but it scraped unpleasantly along her keel, and to crown this day of misfortunes she was in the position assigned on the chart to Traversey Island and might strike upon it at any moment in the dark.

Three days later the Lively reappeared, and after a long fight with fog and gales, the two vessels came in sight of Sandwich Land on the 21st. Three islands were sighted, all of them small, rocky masses, descending steeply to the water's edge, with no beach for a seal to land on, and covered with ice and snow, "so much so that it was hardly possible to distinguish the rocks, the snow and the clouds above these, one from the other." It was hopeless to look for a cargo on such rocks, and that will-o'-the-wisp of the Antarctic seafarer, an "appearance of land" being observed to the southeast, Biscoe set sail in its pursuit. Field-ice soon appeared, and after much manœuvring the ships passed safely through the pack to the southward, where, instead of the open sea, they found merely a great bay of about eight miles diameter, from which they had much ado to escape northward again. Until the end of the month they continued fighting with wind and ice in the endeavour to reach the main body of Sandwich Land by working back to the westward. It was a hard time for both captains and crews:

"Independent of the small seas of field-ice the whole space was completely covered with drift pieces, some swimming very deep in the water, which a vessel striking upon would most likely knock a hole in her bottom, so that from the 26th to the 29th in the forenoon, we were utterly prevented from steering on any one course for more than a few minutes at a time . . . and never at any time had we less than fifty or a hundred ice-islands round us."

On December 29th, two of the islands of Sandwich Land were sighted and the boats sent to search a low-lying reef for seals, but they returned empty, and Biscoe

150 SIEGE OF THE SOUTH POLE

resolved to keep on his voyage towards the east without more delay. The weather turned dazzlingly clear; but no land revealed itself, and the field-ice spread smooth and solid before the ships. They struggled through the pack and drift-ice along its edge, making only twelve miles on their course in a whole day, and never at rest for an hour from the ceaseless tacking and shifting of course to clear the dangerous ice-masses. The absence of life was remarkable, neither seals nor penguins were to be seen, and only a few petrels redeemed the scene from utter desolation. It was the seventeenth of January, 1831, before the parallel of 60° S. was crossed in 70° W., almost at the same point where Bellingshausen crossed it eleven years before. The edge of the pack was now turned and a clear sea lay to the south, with only a few icebergs in sight, and a temperature of 35° in the air. On the 22nd, the Antarctic circle was crossed in 1° E. So far the edge of the pack had been similar in outline, though about a hundred miles farther to the north and east than Bellingshausen had found it; but from this point to 50° E., Biscoe was able to sail for five weeks within or on the circle, often far to the south of the track which the ice had permitted the Russian ships to follow. The farthest south reached was 69° S. in $10^{\circ} 43'$ E., on January 28th. All this time the ship was pressing as closely on the ice-floes as she could with safety; the wind held mostly from easterly points, giving Biscoe "a beating passage of it," and incommoding him very much; and many anxious hours were spent by all on board. The incidents are very calmly treated by the captain, but even he must occasionally have felt a thrill. For instance, one day:

"At 6 p. m., while standing to the southward, we sud-

denly, on the weather clearing up, found ourselves completely beset with large pieces of drift-ice. The helm was immediately put down, and by the careful management of the sails we were enabled to pass through two large pieces, of about the size of our hull, which showed themselves under the bows just as the head-yards were hauled, the vacancy between just sufficient to admit the vessel through; the cutter being a short distance astern, avoided the danger."

The cutter was, however, a constant anxiety, chiefly on account of her habit of getting lost, perhaps from the difficulty of keeping up with the larger vessel in rough weather. On the very day after the escape:

"At midnight the weather became so thick that, although I could speak the cutter, I could not see her, and as we were now completely surrounded by broken ice and obliged to use the sweeps, I made a line fast to her to prevent our separation; the weather quite calm and sea smooth."

The wind continued so light for several days that progress became very slow, but the sea was smooth, and Biscoe was a man with open eyes and a receptive mind for the phenomena of nature. He gave much attention to the formation of sea-ice, making some acute observations, which led him not unnaturally to erroneous conclusions, for though the training of a seaman may turn out an excellent observer, it requires the no less arduous training of a scientific education to enable correct deductions to be made from the facts.

At the end of January the surface of the smooth sea was beginning to freeze and cementing together the broken fragments of drift-ice. Biscoe was struck with the rapidity with which ice an inch thick was formed in

this way at the end of summer, and he argued that when the summer temperature of the air fell at nights far below the freezing point the winter temperature must be very severe indeed, and consequently the surface of the sea may be frozen to a considerable depth. The frozen sea-water might be freshened, he thought, by the continuous addition of snow, and the outcome of his observations was to the effect that the field-ice might be formed in the open sea, and that consequently its presence was not necessarily a sign of the proximity of land. In this, he was no doubt substantially correct; but he went farther in his speculations as to the origin of icebergs. After brooding over the matter for a fortnight he came to the conclusion that icebergs also were creatures of the sea and not of the land, as had always been held before. He knew that Captain Weddell had reported a berg so impregnated with earth as to make it look like a piece of rock, but he himself had seen hundreds of bergs, all of unsullied purity and not one of them bore the least trace of any connection with the land. They might, he thought, be the product of the perpetual freezing of a tranquil sea "accumulating with time." It was the experience of February 25th, 1831, that convinced Biscoe of the truth of this theory. An "appearance of land" had been seen the night before in latitude $66^{\circ} 29' S.$, longitude $45^{\circ} 17' E.$, but at noon:

"That which lately had the appearance of land now bore from E. S. E. to W. S. W. (true bearing), with a large range of field-ice stretching to the N. E. Innumerable icebergs, and the vessels so encompassed with straggling pieces we could proceed no further with safety owing to a strong N. E. swell, which set towards the main body of ice, which it now proved to

be; the appearance of it was, I think, nearly similar to the North Foreland, and I should think the cliffs of it, which bore the marks of icebergs having been broken from off it, and which was exactly similar to their sides in every respect, was as high, or nearly so, as the North Foreland; it then ran away to the southward with a gradual ascent, with a perfectly smooth surface, and I could trace it in extent to at least from 30 to 40 miles from the foretop with a good telescope; it was then lost in the general glow of the atmosphere. As I observed some two or three lumps, which had the appearance of land from the irregularity of their surface, I lowered a boat, and went myself to ascertain whether or not there was any appearance of land on a nearer view, judging myself to be about 3 miles at his time from the main body; but after pulling about half an hour or more, I found we were rather more than half a mile from it still, with the ice so thick we could at times scarcely get the boat through it, and as both vessels were hull down, and entirely at times hid from us by the ice, the weather also having a black appearance from the northward with a heavy N. E. swell, I deemed it most prudent to return after having fully convinced myself this was nothing more than a solid body of ice."

This barrier of solid ice rising like a wall 100 feet or so above the sea might very probably have been part of a great ice-barrier similar to that found by Ross ten years later, and believed by him to be the edge of confluent glaciers or of an ice-cap completely covering an extensive land. Biscoe, however, had persuaded himself that all Antarctic ice was sea-ice and he states boldly:

"I have not the least doubt that the whole spaces, from the latitudes I have visited to the Pole, are one solid

154 SIEGE OF THE SOUTH POLE

mass; land may intervene, or winds, where they are strong and prevalent, may have prevented its forming in some parts more than others, but I have found such frequent calms and light airs with smooth water, that I see no reason why ice should not be formed to any extent during the winter seasons."

These views have recently been confirmed by fresh evidence collected by Captain Scott on the Discovery expedition. Biscoe showed very clearly how the great masses of flat-topped floating ice "accumulated with time," could give rise to all the varieties of peaked and caved bergs which were to be met with by the solvent action of the sea-water on the submerged portion, altering their centre of gravity and causing them to turn over, exposing the fantastically water-worn parts to the air.

On February 6th, a patch of discoloured water was seen, but no soundings were found with 250 fathoms of line. On the 14th a severe gale blew and the cutter got out of sight again. The weather became so thick that lumps of floating ice, collision with which would have sent the brig to the bottom, could hardly be seen until they were almost on board, and the seas broke over the deck and froze so that if some unknown but benevolent Captain Christie had not supplied the crew with boots at Gravesend, the captain declared that half the poor fellows would have been laid up. After four days of anxious search the *Lively* was found again, and on February 20th, when the days were beginning to shorten with uncomfortable rapidity, a fine display of the aurora australis was seen by the officer of the watch, who neglected to report it to the captain before it disappeared, and is censured in the log accordingly. On the same day

the Tula crossed Captain Cook's route in 40° E., almost at the farthest south point made by the great commander at his first dip to southward of the circle. Cook had been compelled by the ice to retire northward at once, but Biscoe was able to carry on on an easterly course, though gradually trending to the northward. On February 28th, after two days of terrible pitching and straining of the vessels in a heavy southeasterly gale, the weather moderated; they tacked to the southward, and from latitude 66° S. and in longitude $47^{\circ} 20'$ E. the captain discerned some hummocks on the southern horizon, which at 4 p. m., much resembled the tops of mountains, and at 6 p. m. it was clear that they really were black mountain summits, standing up from a considerable extent of land. The land, however, appeared very far off and was closely beset with field-ice and icebergs. For two days the vessels struggled gallantly southward, taking advantage of every opening in the ice-pack to edge in towards the land which was now only about 12 leagues off. A magnificent *Aurora australis* also appeared, but Biscoe, at first overjoyed at seeing the splendid phenomenon, soon found it a source of danger, because he could hardly restrain the lookouts and the man at the wheel from gazing up at the sky instead of at the ship's course and the menacing ice. A prominent headland had by this time become familiar, and Biscoe, after finding its approximate position to be $66^{\circ} 25'$ S., $49^{\circ} 18'$ E., named it Cape Ann, but drops no hint as to the identity of the lady thus honoured in his first discovery. A channel of clear water three miles wide was found heading straight for the land, but just as it seemed certain that it could be reached, a southeaster burst upon the ships; the cutter disappeared from view, one of the brig's boats was swept away, others

156 SIEGE OF THE SOUTH POLE

stove in, the bulwarks smashed, and the crew so benumbed by the bitter cold that they could not hold on to a rope for two minutes at a time. The brig became completely unmanageable and drove before the wind; the ice drove with it, and apparently at the same rate, for no collision ensued, and when the weather moderated after five days of hurricane fury, the Tula was little better than a wreck, and had been driven one hundred and twenty miles before the wind.

Although five men out of his small crew were on the sick list as the result of the storm and the most serious anxiety was felt as to the safety of the cutter, Biscoe tried yet again to get south with a southeasterly gale howling against him half the day and subsiding into calm once in every twenty-four hours, until on March 16th, Cape Ann was seen once more, and also a very high mountain. The ice did not seem to have been disturbed in its position by the succession of heavy gales. Summer was over, the air temperature had fallen to 22° F., and sorely against his will Biscoe had to give up all hope of reaching Cape Ann or the coast that bore it, now named after his owners, Enderby Land. He had done his best and could do no more. The log states:

"The land inaccessible, heavy gales frequent every day, some of the people getting sick, the carpenter for some time past having lost the use of his legs, and two others at this time in the same situation, and two or three more under medicine for the same complaint, although every attention has been paid to their health and comfort. The vessel is very uncomfortable in bad weather and ships a great deal of water, and is now on her outside, both hull and ropes, where the spray can reach, one mass of ice."

Yet with all this against him, Biscoe observes that as the land seemed to trend toward the northeast he still hoped to reach it in some part free from ice.

The southeasterly gales continued, the fact could not be overlooked that scurvy had broken out on board, the ship was a mass of ice, although now in 62° S., and at length, on April 4th, the hope of meeting the land was abandoned in 80° E., and a course laid for New Zealand. By this time only three of the crew were able to stand, and it was no longer possible to beat against head winds. The carpenter died on April 24th, and on the 26th only one man of the crew was able to stand, and the ship had to be worked by him, the captain himself, two mates and a boy; it was hopeless to try to make New Zealand, and to save the ship and the survivors of the crew, the *Tula* was headed for Van Diemen's Land. Next day a second man died. On May 8th the brig was off the unfamiliar coast of Tasmania, of which there were no proper charts, and things looked very black on board. Biscoe confided to his log:

"I endeavoured all in my power to keep up the spirits of those on board, and often had a smile on my face, with a very different feeling within."

After all her batterings, the *Tula* was at last safely moored off Hobart Town, on May 10th, 1831; the dying men were removed to a hospital on shore, and Biscoe was at last able to rest for a time, though the absence of the *Lively* was a heavy anxiety. As he entered the harbour he met the *Eliza* cutter, with Captain Weddell on board.

When the *Lively* was separated from her consort in the storm she continued the cruise in the icy seas until deaths had reduced the ship's company to Captain Avery, one seaman and a little boy whose hand had been

158 SIEGE OF THE SOUTH POLE

crushed by the boat falling on it. They could not make Tasmania but reached Port Philip, and when they landed not far from what is now Melbourne they nearly died of starvation, and the cutter drifted away. She was found ashore after a fortnight, and the party reached the Derwent on September 3rd to meet the *Tula* coming out. Biscoe put back and waited until the cutter was refitted and her crew restored to health.

With the southern spring in October, 1831, the *Tula* and *Lively* were once more at sea ready for a fresh campaign, Captain Weddell coming on board to say farewell as they sailed. Three months were spent in sealing on the coasts of New Zealand and off the Chatham and Bounty islands in order to get a cargo, and then the time came to commence the homeward voyage by Cape Horn. A course was shaped for the position assigned by the charts to the Nimrod Islands, 56° S., 158° W.; but no land could be seen, and although there was an appearance of shallow water the sounding-line showed no bottom.

Towards the end of January Biscoe resolved to cross Captain Cook's track (he does not seem to have known Bellingshausen's route), and steer south-eastward in order to look for land to the W. S. W. of the South Shetlands, and Mr. Avery received instructions as to what he should do in case the *Lively* lost sight of her consort. On the 28th they were south of the sixtieth parallel in 131° W., and ice-islands appeared in great numbers, with some loose drift-ice. An extraordinarily low barometer prevailed for several days, the mercury going as low as 27.30 inches, but the expected gale did not occur. Until February 14th, the course was easterly with a little south, bringing the ships gradually to the Antarctic circle along which they sailed without making any attempt to

push far to the south, for Biscoe did not wish to repeat his experiences of the previous summer and arrive at his last sealing ground with a crew incapacitated for work. Accordingly, his course at this part of the voyage lay on the average two degrees to the north of Bellingshausen's track.

The cutter as usual was a source of never-ending anxiety. On February 4th, six hogsheads of water had been put aboard of her from the brig, as the smaller vessel had run short, and Biscoe now thought that drinking ice-water led to dysentery. Mr. White took this occasion to return on board the Tula, as he had had some dispute with Mr. Avery. We are not told who Mr. White was, but immediately on his arrival, Biscoe refers to the bad state of the Lively's canvas, and the necessity for making a quick voyage home. Icebergs continued in abundance and vigilance was increased to avoid them, so that the ice necessitated a change of course to the northward on one occasion only, and when Biscoe reached the point in 78° W., where the Russian ships had been forced northward after finding Peter I. Island and Alexander I. Land, he seems to have had no difficulty in running east-southeast to 67° S. in 72° W. Here land was sighted on February 14th, and from a chance reference to its being the most southerly known land, it would appear that Biscoe was ignorant of the discoveries of his predecessors of ten years before. Three miles off the shore a sounding found no bottom with 250 fathoms. Says Biscoe:

"This island, being the farthest known land to the southward, I have honoured it with the name of H. M. G. Majesty Queen Adelaide. It has a most imposing and beautiful appearance, having one very high peak running

160 SIEGE OF THE SOUTH POLE

up into the clouds, and occasionally appears both above and below them; about one-third of the mountains, which are about 4 miles in extent from north to south, have only a thin scattering of snow over their summits. Towards the base the other two-thirds are buried in a field of snow and ice of the most dazzling brightness. This bed of snow and ice is about 4 miles in extent, sloping gradually down to its termination; a cliff, ten or twelve feet high, which is split in every direction for at least two or three hundred yards from its edge inwards, and which appears to form icebergs only waiting for some severe gales or other cause to break them adrift and put them in motion. From the great depth of water, I consider this island to have been originally a cluster of perpendicular rocks, and I am thoroughly of opinion that the land I before saw last year, could I have got to it, would have proved to be in the same state as this, and likewise all land found in high southern latitudes."

Here Biscoe reveals the unrelenting grip that his theory of the sea-origin of all Antarctic ice had taken of his mind. He doubtless remembered Weddell's suggestion as to the origin of the mythical Aurora Islands from icebergs entangled amongst the Shag Rocks (though as we have seen, he resolutely shut his eyes to Weddell's discovery of an earth-saturated iceberg), and now with the genesis of miniature icebergs from the glaciers of a mountainous island before his eyes, he refused to believe his own senses, and preferred to think that it was only the escape of sea-ice previously caged between the bars of perpendicular rocks.

Next day was particularly clear, and high mountains were seen to the southward at a distance estimated at

ninety miles, but a fog came on and continued for twenty-four hours, making it necessary to steer northwest. Many birds now appeared about the ships and on the 17th and 18th, a row of small islands was passed, the series now known as the Biscoe Islands. They lay in a line from W. S. W. to E. N. E. and were not mountainous, but each covered with a shield of ice and snow perfectly smooth except at the edges. A tier of very high mountains presented a grand appearance in the background, belonging in Biscoe's opinion, to the mainland. On February 19th a landing was made on an island, the position of the middle of the west side of which was fixed by good observations in $65^{\circ} 20' \text{ S.}$, $66^{\circ} 38' \text{ W.}$; but no seals were found on it. This island was named after Pitt, "from the great likeness of an iceberg to that statesman in a sitting posture, and which for some time I took to be a rock."

The island appeared at first to join the mainland, and in a few days Biscoe was able to set foot upon what must have been the land discovered by Palmer and named after him by Powell. Though recent expeditions have shown that this is a group of islands of no great size, Biscoe believed that it was a land of large extent and that he was the first to discover it. He accordingly took formal possession in the name of King William IV., after whom he named the highest mountain, while the peak next in height was named for Captain John Moberly, R. N. The sea was so calm that if any seals had been found the ships could have lain securely alongside the rocks to take them on board.

Biscoe's discovery was subsequently marked on the charts as Graham Land, the name being given in honour of Sir James R. G. Graham, the First Lord of the

Admiralty at the time. The troubled career of this unpopular statesman lives unenviably in common memory in England because as Home Secretary he ordered Mazzini's letters to be opened in the Post Office and communicated to the Austrian government. In Scotland his high-handed proceedings in connection with the ecclesiastical difficulties which led to the Disruption of the National Church in 1843 are not yet forgotten.

It is not easy after the lapse of many years to understand how far the names given to portions of newly discovered coasts were intended by their sponsors to apply to the whole mass of land of which these coasts formed part of the boundary. Fanning undoubtedly understood Palmer Land to include the whole mass of land to the southward of the South Shetlands, and referred to it as a continent. Biscoe's "mainland," the Graham Land of the British charts was no doubt meant to be equally inclusive, and so too, was Johnson's New South Greenland. Making allowance for the uncertainty of longitudes determined even with the utmost care by ships whose chronometers had not been rated for months, or perhaps even for years, we can easily understand the confusion wrought by the multiplication of overlapping names, and this confusion was made worse confounded by the fact that as a rule each discoverer was ignorant of the work of his predecessor. As a matter of historic justice, it seems to us that Powell's name of Palmer Land ought to be retained for the whole group of islands, and possible continental peninsula south of the South Shetlands, Graham Land might well be restricted to the southern part south of Adelaide Island, and the other names be fixed to definite members of the group; but to this subject we must return later.

Discoveries, even though they included a new continent, would not fill the hungry holds of the sealers, so Biscoe made for the South Shetlands, where he expected that "the March bulls would be coming up." On March 5th the Tula was securely anchored in the land-locked harbour of New Plymouth, while Biscoe worked among the islands in the cutter collecting a scanty harvest of sea-elephants. He returned on April 2nd, and the mate of the Tula reported that on one occasion a heavy swell had set into the harbour and menaced the ship. Preparations were accordingly made to get away as soon as possible, the Lively to proceed direct to England, while the indefatigable Biscoe was to take the brig off to the nearest sperm-whaling ground to fill up with oil. Everything was ready for departure on April 10th, but before the anchors were got up the wind shifted to the northeast and sent in a terrific swell, which the Lively rode in safety, but the greater draught of the Tula caused her to strike the ground in the trough of the huge waves. So serious did the situation become that the brig had to be abandoned, her rudder being broken and the breakers making a clean breach over the vessel. She must have been a stoutly-built craft, however, for she was not stove in, and when the weather moderated the rudder was temporarily hung with ropes and on April 29th, 1832, after a stormy passage, the Tula reached Berkeley Sound in the Falklands for repairs.

At the Falklands the two vessels again lost sight of each other and on touching at Santa Catarina in Brazil, Biscoe learned that the poor Lively, after following him round the world, had come to grief at last in the Falklands, where her crew remained while the Tula anchored in the Thames on January 30th, 1833.

164 SIEGE OF THE SOUTH POLE

Biscoe's voyage won for him a well-deserved reward from the Royal Geographical Society in the form of the second gold medal it ever awarded. Although the voyage brought no pecuniary profit to the owners, they were highly gratified at the magnificent feat of sailing for 160° of longitude south of 60° S., and for almost fifty degrees within the Antarctic circle itself, as well as at the discoveries of land. They gave Biscoe vessels for another voyage without delay and made elaborate arrangements for combining geographical discovery with commercial seal-hunting. The Admiralty also interested themselves in the matter and appointed Mr. Henry Rea, R. N., to accompany the expedition as a surveying officer. Biscoe commanded the brig *Hopeful* in which Rea was a passenger and sailed from London on May 13th, 1833. No narrative of the cruise has been preserved, so far as we can ascertain, and the facts must be pieced together from fragmentary notices. The *Hopeful* reached the Falklands on October 23d, and found that a terrible tragedy had occurred there. A party of South American convicts transported to the islands had fallen upon and massacred the leading men of the little group of British settlers, including Matthew Brisbane, the superintendent, who had been Weddell's companion on the famous voyage of the *Jane* and *Beaufoy*. From the tone of an official letter in which Rea announces the fact of the massacre it would seem as if he were then in command of one of the ships, if not of the expedition, for he speaks of his arrangements and his plans without mentioning anyone else. Biscoe met Captain Dumont D'Urville at Hobart Town in 1839, and appears to have talked freely about the failure of this expedition, and D'Urville says on the direct authority of this interview: "Personal

reasons made Biscoe give up this voyage, and another was charged with the expedition." The two vessels reached the South Shetlands in the southern summer of 1833-34 and appear to have found the ice conditions very severe. They seem to have sailed toward Alexander Land in the hope of making a circumnavigation westward in a high latitude, but they were beset in the ice and the *Hopeful* was crushed and sank, all hands being saved by the smaller vessel. Biscoe suggested to D'Urville that this was due to the inexperience of the commander. Biscoe returned to London about January, 1835, when Mr. Enderby handed to him the gold medal of the Paris Geographical Society awarded in April, 1834, for his Antarctic explorations. In acknowledging this award the explorer said in a letter to the President:

"Allow me to express my very hearty and sincere thanks to the Society, and to assure you that if an opportunity to revisit those latitudes again presents itself, neither difficulty nor danger will prevent me from resuming the exploration of a part of the world still almost unknown and now so interesting."

Biscoe continued in the employment of Messrs. Enderby, and while in command of the brig *Emma* he made several attempts to push exploration to the southward of New Zealand, but had always been stopped by the ice about 63° S. In January, 1839, he had been spoken by Balleny off Campbell Island, and at the close of the same year he met Wilkes in Sydney Harbour. Shortly afterwards he visited D'Urville at Hobart Town, and then said that he knew of no land having been discovered south of Tasmania. The interview with Wilkes in which he informed the latter of the discovery of the Balleny Islands would thus seem to have occurred later, on

166 SIEGE OF THE SOUTH POLE

Wilkes's return from his southern cruise. The whole matter is confused and difficult to follow.

When Biscoe subsequently returned to England he fell into poor circumstances and died in 1848 in such depth of poverty that his widow and four children were only saved from starvation by a timely subscription got up by seafaring men.

In 1893 Mr. J. G. Foxton communicated to the Melbourne Branch of the Royal Geographical Society of Australasia a paper entitled "Notes of a long-forgotten Antarctic voyage in 1833" which were set down from his recollection of the expedition on which he himself had sailed. The expedition was in two ships, the *Hopewell* and the *Rose*, belonging to Messrs. Enderby, under the command of Lieutenant Binstead, R. N. They discovered land in 70° S. between 10° and 20° W. and then the *Rose* was crushed in the ice and all hands escaped in the *Hopewell*. The land had been seen a few years earlier by a Russian expedition, the reports of which Binstead had been sent out to confirm. The paper is interesting as an example of the tricks that memory can play sixty years after the event. For *Hopewell* we must read *Hopeful* and for Binstead we must read Biscoe, and we must add about fifty degrees to the longitude before we can realise that the long-forgotten voyage was that of Biscoe and Rea, a contemporary account of which would be such interesting reading. Perhaps Mr. Foxton's memory for incidents may have been stronger than for names and positions, but we cannot trust it, and only mention his account because it has already been cited in books of reference and at first sight it might appear as if the Coats Land discovered by Mr. W. S. Bruce in 1904 had been seen seventy years before.

Although the Enderby's attempt at exploration in 1833 ended in failure and Binstead was a figment of the mind, a British sealer named Kemp also sent out by Messrs. Enderby made a notable voyage in that year of which nothing is known save his track on the chart. Sailing southward from Kerguelen nearly on the meridian of 60° E. he discovered signs of land in 66° S., and although Kemp Land has never been seen again it continues to be shown on the map.

The interest of the Enderbys did not flag, and in 1838, in spite of the heavy financial loss incurred by Biscoe's voyage and that which followed, they in conjunction with seven other London merchants, fitted out a new expedition, the results of which were scarcely less remarkable than Biscoe's. On July 16th, 1838, the schooner *Eliza Scott* of 154 tons, with John Balleny in command, accompanied by the dandy-rigged cutter *Sabrina* of 54 tons, under H. Freeman, left the Thames on a sealing voyage, with instructions to push as far to the south as possible in the hope of discovering land in a high latitude. The little squadron was provided with three chronometers and was otherwise well equipped.

After spending some time in Chalky Bay in the South Island of New Zealand, where the crews of both vessels were in a state bordering on mutiny, Balleny sailed on January 7th, 1839, and on the 11th entered Perseverance Harbour, Campbell Island, where by a curious coincidence he met John Biscoe engaged on a sealing voyage in the *Emma*, just as the latter had met James Weddell in Hobart Town when performing his memorable circumnavigation. Sailing thence on January 17th, the voyage was resumed to the south, and Balleny, getting to the south of Bellingshausen's track on the 27th, reached

168 SIEGE OF THE SOUTH POLE

the Antarctic circle in longitude 178° E., on the 29th. Field-ice bounded the southern horizon, and numerous bergs were in sight. On February 1st the Eliza Scott and Sabrina were stopped in latitude 69° S., longitude 172° E., by a large body of packed ice. They did not attempt to penetrate the pack, but worked to the northwest along its edge against a strong westerly wind, which they had not expected to find so far south. No previous voyagers had ever got so far south in these longitudes. For several days the weather was thick and foggy, with light winds. The sea was discoloured; there were feathers floating about and many seals and penguins were seen, while whales were also plentiful. Little progress was made and except the ice surrounding the ships, nothing could be seen.

On February 9th, 1839, at 8 a. m., the sky cleared and an observation for longitude was obtained which gave the position as $164^{\circ} 30'$ E. At 11 o'clock, a dark appearance was noticed to the southwest and the sun continuing to shine brightly, allowed an observation for latitude to be made at noon, giving the position as $66^{\circ} 37'$ S., while the appearance noted an hour previously was seen to be land. A course was immediately set for the land, and at 8 p. m. it was within five miles of the vessels, showing up as three large and very high islands, with a number of smaller ones. Next day the Eliza Scott succeeded in getting to within a mile of the middle island, but it was found to be closely invested with ice and no landing possible. Fog soon came on and continued for two days, with occasional clear blinks. A glimpse of the land obtained in one of these showed a mountain of tremendous height, estimated by Balleny at 12,000 feet. On February 12th both captains made an

attempt to land in the Sabrina's boat at the only accessible place on the island bearing the great mountain, a beach of a few feet wide which was uncovered only for a moment as each wave drew back. Balleny describes the visit tersely and without any attempt at picturesque description, for he had no gift of language:

"Captain Freeman jumped out and got a few stones, but was up to the middle in water. There is no landing or beach on this land; in fact, but for the bare rocks where the icebergs had broken from, we should scarce have known it for land at first, but, as we stood in for it, we plainly perceived smoke arising from the mountain tops. It is evidently volcanic, as the specimens of stones, or cinders, will prove. The cliffs are perpendicular, and what would in all probability have been valleys and beaches are occupied by solid blocks of ice. I could not see a beach or harbour or anything like one."

The schooner and cutter held on their course to the northwestward and saw no more of the land. There were altogether five large and two small islands to which the names of five of Mr. Enderby's partners in the cruise are attached, the other two being commemorated in the peaks. The names given in Mr. Enderby's paper do not correspond exactly with those on the Admiralty charts, but there is no official tribunal to decide on these matters and it is sufficient to say that the names to whom the deserved honours were paid in 1839 were G. F. Young, W. Borradaile, J. W. Buckle, T. Sturge, W. Brown, J. Row, and W. Beale, together with Captain Freeman of the Sabrina, who stands godfather to the great mountain on Young Island, where he landed. Fortunately the second mate of the Eliza Scott, named John MacNab, had some little skill with the pencil

170 SIEGE OF THE SOUTH POLE

and succeeded in making a sketch of all the islands of the Balleny group from a distance of about nine miles. In this sketch the most prominent features are the lofty cone of Peak Freeman on Young Island and the smoke rising from an active volcano on Buckle Island. Beale Pinnacle, a rock off the eastern end of Borradaile Island, is described as rising from the water like a lighthouse.

The course westward was made between the latitudes of 63° and 65° S. without any incident to break the usual succession of icebergs and fogs except a supposed sight of land on February 26th, which was afterwards believed to be merely fog hanging over an iceberg. Then on March 2nd, the ships being in 65° S. 121° E., land was sighted to the south, but no further particulars are given, either in Balleny's log or in that of William Moore the chief mate of the Eliza Scott, the latter remarking only that "the supposed land" was not more than one mile to windward. Next day an attempt was made to get towards the land through the ice, but the pack was too heavy to penetrate, and although the "appearance of land" was logged as visible beyond the ice on two occasions that day it does not seem to have been very decided. Although the name of the cutter Sabrina has been given to an appearance of land at this point, we cannot look upon its discovery as proved by the vague references made by the explorers.

On March 13th an iceberg about 300 feet high was passed within a quarter of a mile in 61° S. $103^{\circ} 40'$ E., the weather being particularly fine and calm. About 20 feet up the side of this a block of dark stone, about 12 feet high and 6 feet wide embedded in the ice, was conspicuously visible, a circumstance that attracted the special attention of the artist mate MacNab and led



Row Island

Young Island

Barbaric Island

North Island

South Island

The Balleny Islands.
(From a Sketch by John MacNab.)

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ASTOR, LENOX AND
TILDEN FOUNDATIONS.

to an interesting note by Charles Darwin. The strong belief of Biscoe that all Antarctic ice originated at sea led that explorer to ignore or explain away the reports of earth-stained ice made by Weddell and others, but Darwin points out that a stone had once before been seen on an iceberg during a sealing cruise by a former boatswain of H. M. S. Beagle. The existence of these embedded rocks can only be accounted for on the hypothesis of the origin of the icebergs as land-ice, and Darwin points out that the block seen by the Eliza Scott must have drifted certainly more than 100 miles, and probably more than 450 miles from the land of its origin, while it was 1400 miles distant from the nearest certainly-known land, that of Enderby.

This day was diversified by another episode which was much more momentous for the two junior members of the expedition than any discovery in natural science. The veil rises for a moment from the social life of those two lonely little craft tossing amongst the ice on the very verge of the known world, but it falls again so quickly that we can picture little from the glimpse. "This morning Captain Freeman came on board and brought the boy Smith with him and took the boy Juggins on board the cutter." We can only speculate whether the wretched Smith was brought on board for purposes of discipline and the proud Juggins promoted to his place, or whether the miserable Juggins was condemned for some dereliction of duty to the smaller craft and fortune smiled on the happy Smith. A good deal hinges on the question whether the boy Smith was identical with Smith the fisherman, for on the 16th Moore once more refers to the life on board:

"At 10 Smith, the fisherman, being at the tiller, and

172 SIEGE OF THE SOUTH POLE

it getting dark and all hands busy shortening sail, the captain conned the vessel, intending to hail the cutter, when giving directions to Smith to starboard and port the helm as required, desired him to answer that he (the captain) might know whether he heard him or not, when Smith became exceedingly insolent to the captain, and at last let go the tiller, hove the tiller-rope in the captain's face and swore that he would not take the tiller any more while he was in the vessel, and was so abuseful that the captain was obliged to take him by the neck and push him forward and beat him severely." A marginal note on the log, probably in the captain's hand, states that "the last three words were written many days afterwards and in pure malice." Next day we are told that Smith remained below, refusing to do his duty, and a day later that he was not well. There must have been many rough episodes in the strenuous life of those vikings of the south, and the skippers had to be men of action ready to repress insubordination by methods that their semi-mutinous crews could understand.

The course was now altered to a northerly one along the 95th meridian of east longitude, and until the ice was left behind fine displays of the aurora australis were observed every night. On March 24th a gale rose and the Sabrina was evidently in distress, burning blue lights. At daybreak next morning the cutter was nowhere to be seen and Balleny, now very anxious for her safety, had as much as he could do to enable his own ship to weather the storm. A heavy sea broke on board staving both boats, sweeping everything from the deck and laying the vessel on her beam-ends so that for ten minutes she seemed to be settling in the water; but the

stout little schooner righted herself and sustained no serious damage. The Sabrina was never heard of again. By September 17th the Eliza Scott was safe once more in the port of London in time to report the result of her discoveries to Captain James Clark Ross, who was on the point of sailing with the Erebus and Terror.

Balleny's cruise proved for the first time the existence of land within the Antarctic circle south of New Zealand, and by means of it the firm of Enderby forged still more links in the strong chain of evidence that either the edge of an extensive continent or a long series of islands lay to the south of the Indian Ocean just within or on the Antarctic circle, portions of which appeared in the Balleny Islands on the east, Enderby Land on the west, and at Kemp Land and possibly Sabrina Land between the two.

In 1847 the Messrs. Enderby obtained from the British Government a concession for the exclusive possession of the Auckland Islands as a whaling station, and the Southern Whale Fishery Company was established. At least one important voyage of exploration resulted, but it has been almost lost sight of by the unaccountable loss of the documents given by Mr. Charles Enderby to a member of the Council of the Royal Geographical Society for preservation in the library. In mentioning this fact at a meeting of the Society in 1858, Mr. Enderby said that in February, 1850, Captain Tapsell left the Aucklands in the ship *Brisk*, sighted the Balleny Islands and proceeded thence to the westward as far as the meridian of 143° E. in a considerably higher latitude than that followed by Wilkes, and without sighting any land.

CHAPTER IX

THE DAWN OF THE VICTORIAN ERA

“ . . . A closer link
Betwixt us and the crowning race

Of those that, eye to eye, shall look
On knowledge; under whose command
Is Earth and Earth's, and in their hand
Is Nature like an open book.”

—TENNYSON.

THE nineteenth century stands by itself, set apart from all the centuries of history which went before it by the rapid advance of natural science and its applications to practical ends.

As the means of travel were perfected the motive which led to exploration changed, and while for the first thirty years of the century the aims of explorers were not dissimilar from those of Columbus and Magellan, during the last seventy years there were in the political sense no worlds left for the seafarer to conquer. The desirable temperate lands were all occupied or at least “pegged out” by European nations, and the great trade routes were fairly established and free from any national restrictions.

The period of transition between 1830 and 1840 led to the establishment of the life and thought of to-day, to the manners and ideals which stamp this portion of history as an era requiring a name, and it is perhaps the last era in the history of the world to which the name of any sovereign will be entirely applicable. The era

was one during which in science, trade, and political ascendancy the United Kingdom became and remained greater than any other nation of the world. Towards the end other great Powers, and particularly the United States and Germany, have come to the front by strides so gigantic as to make it practically impossible that any one Power can ever again be so far ahead of the rest as Britain was in the zenith of the Victorian Era. This is not the place to discuss the causes of that pre-eminence or to speculate as to its duration, nor can we claim the special field of the present volume as that in which the pre-eminence was most strikingly displayed. Still without claiming for British explorers greater daring or a stronger sense of duty or a more fervid patriotism than animated the explorers of other nations, we cannot shut our eyes to the fact that in the British subject the elements are so kindly mixed as to have made success a tradition of the flag.

The term Victorian Era is not used in any narrow or merely national sense. It is intended to cover the period following the scientific renaissance of the nineteenth century, which was restricted to no country, but in which one nation profited by and improved upon the thought and work of another. Partly by rivalry, partly by co-operation they made of modern science not so much a finished statue as a working engine, always being improved in one part or another.

New learned bodies which expanded and multiplied with the specialisation of science were everywhere springing into existence before Queen Victoria ascended the British throne, and spurring the august Academies and Royal Societies out of their ancient calm. The Paris Geographical Society was founded in 1821, that

176 SIEGE OF THE SOUTH POLE

of Berlin in 1828, and the Royal Geographical Society in London in 1830. The last named claimed some sort of relationship it is true to the African Association of 1788; but to all intents and purposes it was new in scope and in enthusiasm. The German gathering of Physicians and Men of Science which met periodically in different centres for the purpose of stimulating popular interest in the study of Nature had recently been founded and proved a great success. Sir David Brewster heard of it, visited one of its meetings, and returned to found in 1831, with other active scientific men full of the growing enthusiasm for natural knowledge, the British Association for the Advancement of Science. From the outset this Association, though sneered at by not a few of the older hide-bound professors of the earlier period, set about the exhaustive discussion of pressing problems in pure and applied science.

Gradually in every country of Europe and in the United States the need of a more exact and complete study of the laws of terrestrial magnetism had been recognised, and a period of rapid advance in magnetic observation set in, accompanied by improvements of the instruments employed in the field or in the observatory, and of the methods of calculation. The problem presented by terrestrial magnetism is by no means entirely solved even now; at the beginning of the nineteenth century it could hardly be propounded. In 1836 Humboldt declared that no other branch of science had advanced so far in a single generation.

It is not necessary to tell anyone now-a-days that poetic phrases such as "true as the needle to the pole" do not represent the fact. It is generally known that the freely poised magnetic needle points in a different direc-

tion in every place, and that the direction varies in any one place from time to time. Some of these variations are temporary and irregular, partaking of the nature of storms, others are steady and uniform, admitting of ready calculation and prediction when a sufficient number of data is known.

The difference between sciences based on observation and those based on experiment, is that in the former no short cut is possible to arrive at the theory binding together all that has been discovered, and pointing the way to all that remains to be found out. The toil of hundreds, or it may be thousands of observers is necessary for scores of years, or it may be for centuries before the raw material has been accumulated in sufficient quantity for the theoretical mathematician to deduce and prove his simplifying theory. It was so in the case of astronomy, and it has been so in the case of terrestrial magnetism, and it is so in the case of meteorology.

The scientific study of magnetism began in the spacious days of Queen Elizabeth, when Dr. Gilbert of Colchester proved the properties of the lodestone and stated many fundamental facts as to the dip of a freely suspended needle toward the horizon and its deviation horizontally from the meridian or north and south line. Observers in all parts of the world had kept records for longer or shorter times which showed that the compass needle pointed to the east or west of north in almost every place, and that the amount of its deviation from the true north was progressively changing. Thus Gilbert had found in 1576 that the compass needle pointed eleven degrees east of north in London and year by year this easterly declination diminished until in 1652 the needle pointed due north—the poets of the middle of the

178 SIEGE OF THE SOUTH POLE

seventeenth century being right enough in symbolising fidelity by the true-pointing compass—but year by year the declination continued to increase, this time toward the west, until in 1815 it came to a maximum of $24\frac{1}{2}^{\circ}$ West of North, the compass needle actually pointing N.W. by $N\frac{1}{4}N$. Since that time it has been steadily returning toward true north. These were facts so prominent that the roughest observations served to make them plain. It was only when the scattered data were collected and critically compared that the difficulty of arriving at a general statement became obvious.

The astronomer Halley it will be remembered had taken command of a ship of war in 1700, when he conducted the first scientific expedition under the British or any other flag to study magnetic declination in the North and South Atlantic. The result was to enable him to produce the first magnetic chart on which he had the happy inspiration to draw curves connecting all places where the magnetic declination had equal values. This was the first use of that invaluable cartographical method of contour lines which has since proved, one might almost say, the foundation of the science of geographical distribution, for it enables all phenomena, visible or invisible, to be represented on maps if they are capable of being measured and expressed in figures.

Following Halley's advice ship-masters continued to note the variation of their compasses from time to time and to place their results on record, but for more than half a century these results were so chaotic as to be practically valueless. Then Captain Flinders discovered that the iron of a ship affected the compasses in a different way when the ship's head pointed in different directions, so that a great part of the observed variation was simply

due to changes in local attraction. A method was eventually devised by the English physicist, Barlow, for getting rid of this source of error by compensating masses of iron suitably arranged near the compasses, and the observations were thus improved in scientific value. The instruments were rough and the methods crude until the beginning of the nineteenth century, when terrestrial magnetism assumed an importance never before attained.

Humboldt on his unparalleled scientific journey in South America had paid special attention to magnetic work, though he neglected no branch of human knowledge—being as he was the last man who could grasp the whole of the rapidly widening sheaf of natural science. The observatories he subsequently established in Europe showed that the minor perturbations of the magnetic needle were simultaneous over vast areas of the Earth's surface, and suggested the magnificent conception that their origin was not local but cosmical, due to some influence outside the Earth altogether, to the variations of which all parts of the globe responded at the same moment. On his geological expedition to Siberia in 1829 Humboldt, with the permission and indeed the active assistance of the Russian Emperor, established a chain of magnetic observing stations from Moscow throughout Siberia to Peking and across the Pacific in Sitka. Distinguished physicists in the United States, amongst whom Bache deserves to be specially mentioned, carried similar observations across America.

The great Norwegian physicist Hansteen, and the Russian explorer Erman, had conducted magnetic surveys throughout Siberia, north into the Arctic circle, and round the world through the Pacific and Atlantic Oceans, bringing together an immense amount of new

180 SIEGE OF THE SOUTH POLE

data which Hansteen utilised in his great work on **the Magnetism of the Earth**, published in 1819. Like Halley, he endeavoured to find what possible arrangement of magnets, hypothetically supposed to exist within **the Earth**, and to shift their position from time to time, would account for the varying phenomena observed on the **surface** and enable them to be predicted to the advancement of science and the advantage of navigation. Barlow, in 1833, also compiled an elaborate chart of magnetic declination and followed in the quest of a possible explanation, trying to fix what number of "magnetic poles" existed on the Earth or wandered over its surface. To him the problem appeared so insoluble that neither four nor any number of poles were sufficient to account for the observations, but he thought that "there is no determinate pole to which all needles point, but that each place has its own particular pole and polar revolution governed probably by some one general but unknown cause."

Meanwhile, the British Association, in the pride of its youth, was appointing committees to report on the existing state of knowledge with regard to all branches of science, and magnetism received a full share of attention. Edward Sabine, an enthusiastic physicist rapidly gaining promotion as an Artillery officer in virtue of his scientific discoveries, had already carried out magnetic and geodetic surveys in many distant parts of the world, from the Arctic regions to the poisonous swamps of West Africa. James Clark Ross, a no less enthusiastic naval officer and tried Arctic explorer, had had the proud experience of localising the North Magnetic Pole—using that name for the point at which the compass ceased to have any directive force, but where the freely suspended

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General Sir Edward Sabine, K.C.B.
(From a Painting in the Rooms of the Royal Society.)

THE NEW YORK
PUBLIC LIBRARY
ASTOR, LENOX AND
TILDEN FOUNDATIONS

needle pointed with its north-seeking end vertically downwards. The Rev. Prof. Humphry Lloyd, of Dublin, had perfected instruments for magnetic observations and made many important researches on these subjects. All three were associated on one of the British Association committees, the work of which consisted of making a magnetic survey of the British Isles between 1833 and 1837, proceeding on the sound policy of beginning at home.

At the same time in 1835 Sabine presented to the Association a full abstract of Hansteen's "Magnetism of the Earth." Two years previously, Mr. S. Hunter Christie, of Cambridge, in a survey of the existing views as to the magnetic theory had introduced for the first time to most British readers the name of a German mathematical physicist, Johann Karl Friedrich Gauss, who held original views on terrestrial magnetism, as to which the Cambridge don pronounced an opinion so guarded that whether the views in question were ultimately approved or buried in oblivion, his judgment would appear to have been justified by the event.

In 1823 Johann Kaspar Horner, who had sailed round the world with Krusenstern as magnetic and meteorological observer, revised and greatly improved a map by the Swedish investigator Wilcke showing lines of equal magnetic dip for the whole Earth so far as observations went. This made it possible for Sabine to present to the British Association a Report of epoch-making importance on the Distribution of Magnetic Intensity. The fact that the total intensity of magnetic force varied from place to place had been known for some time, but until Sabine's experienced eye had inspected and discussed the records no systematic attempt had been made to place these variations on a chart.

182 SIEGE OF THE SOUTH POLE

Not until 1837 had it been possible to present in a comparable and trustworthy form the data of all three magnetic elements—the declination or degree of variation of the needle from the true north, the dip or inclination of the needle to the horizon, and the total intensity of the magnetic force. The time was opportune, and the man was ready whose genius and training enabled him to combine these three elements, each elaborated by a brilliant specialist from the isolated labour of hundreds of observers, into one stately and harmonious theory. It would be hopeless to attempt to describe the theoretical reasoning of Gauss in a popular book, and in this volume the theory of terrestrial magnetism concerns us only in so far as it was an incentive to Antarctic exploration. It must therefore suffice to say that Gauss deduced a formula by which he could calculate the magnetic elements for any spot on the Earth's surface at any time, and so far as observations were available by which this formula could be checked, it stood the test triumphantly. Amongst other consequences of the theory it was shown that a south magnetic pole similar to the north magnetic pole found by James Clark Ross in Boothia Felix must exist in or near the latitude of 66° S. and the longitude 146° E. It would naturally be a triumph for the theory if the south magnetic pole were discovered in the region assigned, for the stations where magnetic observations were available in the southern hemisphere were so few that there, if anywhere, an error in calculation would be most likely to arise.

The importance of obtaining observations to fill up the gaps in the magnetic maps had often been urged, but during the years from 1833 to 1837 the matter was receiving more and more earnest attention. The scien-

tific mind was fully awake to the value of completing the observational basis of theory; the practical intelligence of the country did not fail to grasp the vast possibilities of improved navigation. In the "thirties" a voyage to India, to Australia, where trade was increasing with the rising colony of New South Wales, above all to China, was a very serious matter and the risk of shipwreck was great. Anything which tended to reduce that risk was to be welcomed eagerly. Steam navigation was beginning and the possibility of constructing ships entirely of iron promised an unprecedented expansion of ship-building. The first iron steamer to attempt a voyage in the Irish Sea had been nearly lost on account of her compasses proving useless; but Mr. G. B. Airy—for so many years Astronomer Royal—after devoting much study to the question had shown how the disturbing effect of an iron ship could be practically neutralised. For a long voyage therefore the chief danger of treachery in the compasses was reduced to the uncertainty of the magnetic conditions of the Earth itself, especially in such places as the far south of the Indian Ocean where the declination changed rapidly.

The world is wide and the interests of science are many and diverse, so that it is impossible to preserve a strict chronological order in describing the steps which led to the great era of Antarctic exploration. We are not wrong, however, in saying that this revival was a case of magnetic attraction, the other causes being combined with that in a minor degree.

At the meeting of the British Association in Dublin in 1835 many important magnetic papers were read.

Robert Were Fox described his newly invented instrument for measuring the dip, which was capable of being

184 SIEGE OF THE SOUTH POLE

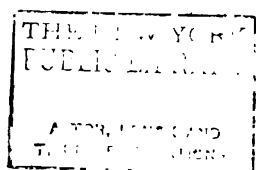
used at sea; Sabine presented his translation of Hansteen's great work and referred to the blanks which remained to be filled, and the committee on Magnetism in 'set terms adopted the following recommendation:

"That a representation be made to Government of the importance of sending an expedition into the Antarctic regions, for the purpose of making observations and discoveries in various branches of Science, as Geography, Hydrography, Natural History and especially Magnetism with a view to determine precisely the place of the south magnetic pole or poles, and the direction and inclination of the magnetic force in those regions."

The Council of the Association assumed a very cautious attitude, reserving any action until they had seen the result of the report on magnetic intensity which they called upon Sabine to prepare. To this request he responded with splendid effect, but during the two years while the Report was preparing he could not remain silent as to the pressing need for an expedition, and we know that he discussed the matter earnestly with Baron Humboldt, then the first man of science in Europe. On April 22nd, 1836, while the dispatch of an American expedition was a matter of lively dispute in Congress, and while a great French expedition to the Pacific was forming as a dream of ethnographical research in the mind of Dumont D'Urville, Humboldt under the strong impression created by conversations with Sabine, addressed a weighty letter to the President of the Royal Society, at that time H. R. H. the Duke of Sussex. This letter appealed for the establishment throughout the British Empire of a series of magnetic observatories similar to those which the Russian Emperor had established across Siberia. Committees were appointed to report upon the



Baron von Humboldt.



letter and to draw up plans for the proposed establishments; but difficulties and delays of many kinds arose and for a couple of years things made but little progress. The Royal Society applied to the Government for funds to purchase magnetic instruments early in 1837, and money was at once granted. Then some trouble arose as to what instruments were to be bought. Many of the British authorities looked with distrust on the new forms of apparatus introduced by Gauss and used at continental observatories, and while these were being tested at Greenwich Observatory the months and years were slipping past. A contemporary, evidently a man of high authority, writing in the *Quarterly Review* a few years later states that:

“While thus in abeyance a movement from another quarter gave a decisive turn to the whole project, by striking at once an outline so full and sweeping as to meet all the exigencies of the case.” This movement was the long delayed action of the British Association.

During the period when both the bodies representing natural science as a whole were deliberating and delaying, events were moving forward. The American Exploring Expedition was decided upon, with Antarctic research as a large part of its programme. Lieutenant Wilkes of the United States Navy came to London to buy magnetic and nautical instruments, and a notice probably derived directly from him and written by Captain Washington, R. N., then secretary of the Royal Geographical Society, appeared in the *Journal* of that society for 1836. It gave a brief outline of the American plans, stated that the expedition would probably start in the Spring of 1837, and welcomed in the warmest possible way the accession of the United States to the number of

186 SIEGE OF THE SOUTH POLE

the great exploring nations of the world. Captain Washington was in close and constant communication with the Paris Geographical Society, and transmitted to it all the information he received as to the forthcoming expeditions; but as he could not stir his own Council to any active steps toward competition with the foreign expedition, the idea of coöperation could hardly yet be proposed.

Early in 1837 an anonymous pamphlet signed A. Z. appeared in the form of a letter to the President and Council of the Royal Geographical Society on the subject of Antarctic Discovery. This was obviously the work of Captain Washington, and was indeed practically acknowledged by him a few years later. The pamphlet contained an able summary of Antarctic exploration with a map showing the tracks of Cook, Biscoe, Weddell, Morrell, and for the first time on any English chart the track of Bellingshausen also. It contained a fervid appeal to British patriotism suggested by the announcement of the approaching American Expedition, and urged the Council of the Royal Geographical Society to come forward and press upon Government the necessity for a national expedition, or if need were to coöperate with the spirited London merchants in fitting out a private expedition to the farthest south. The appeal was supported by three arguments: the acquisition of scientific facts, the commercial results likely to accrue from the revival of sealing in the Southern Ocean, and the credit of the country as a pioneer of discovery. The letter of Humboldt was referred to and it was asserted that:

“All Europe looks to this country to solve the problem of Terrestrial Magnetism; and all Europe, nay all civilised nations, would unanimously point to that individual

who has already planted the red cross of England on one of the northern Magnetic Poles, as the man best fitted to be the leader of an expedition, sent out for such a purpose."

This was the first suggestion in print of what must have been an understood matter amongst the promoters of the expedition, that James Clark Ross was the natural and indeed the inevitable commander. The fervour of the appeal to patriotism may be judged by two quotations from A. Z.'s letter:

"Oh! let it not be said that more than half a century elapsed since our immortal countryman Cook sacrificed his life in the cause of discovery, and that no step was taken to follow up the glorious track in which he led the way,—that all within the Polar circle still remains a blank on our charts;—nay, infinitely more to our disgrace, that we, who date a thousand years of naval supremacy, allowed a nation but of yesterday, albeit gigantic in her infancy, to snatch from us our birth-right on the ocean, and to pluck the laurels that have been planted and watered by the toils of our seamen."

"I . . . conclude with the earnest hope that through your exertions my wishes may be realised, and that ere long the Southern Cross may shine over an expedition sailing to the Polar Seas—that Cross sung by Dante and Camoens of old, which has served as a banner in a far more sacred cause—that cross which by its position points out the hour of night to the Indian wandering o'er the pathless desert of Atacama, or the mariners ploughing the trackless ocean—that Cross which brightly shone o'er Diaz and Columbus and Vasco da Gama—and that Cross which I ardently hope will once again shine o'er the 'Meteor Flag of England,' proudly wav-

188 SIEGE OF THE SOUTH POLE

ing o'er Antarctic land, discovered by the zeal and intrepidity of British seamen."

No direct result followed the effort of A. Z., the Royal Geographical Society remained impervious to the appeals of its secretary, seconded as these no doubt were by Mr. Enderby, and so it had no part in the great era of Antarctic research. Dumont D'Urville who was on the point of sailing with a French expedition, part of whose programme was to attain a high southern latitude, translated the letter for the Paris Geographical Society and doubtless laid to heart its patriotic appeals *mutatis mutandis*. . . . The dispatch of Balleny on his southern cruise which has already been described was also possibly in part a result of the letter.

The British Association, meeting at Liverpool in 1837, received Sabine's great Report on the variations of Magnetic Intensity, in the course of which he again strongly urged the dispatch of an Antarctic expedition. He quoted a letter from Professor Hansteen who said that the poor Norwegian nation had through its Storting voted a handsome sum towards a magnetic expedition into Siberia in the very session in which they had refused a grant for a new royal palace in Christiania, and this being so it was not too much to expect the wealthy British nation to make itself responsible for a magnetic survey of the whole southern part of the Earth. Sabine concluded by saying that there was a naval officer available eminently fitted to be the leader "and if fitting instruments make fitting times, none surely can be better than the present."

In May, 1838, the Royal Society appointed a committee on mathematics and physics to deliberate further on the question of magnetic observatories and a South Polar

voyage; but took no action until the British Association, at last fully committed to the enterprise, had taken the decisive step. At the Newcastle meeting of the Association in August, 1838, Captain Washington had read a paper on Antarctic Discovery to the Geographical Section (which that year had an independent existence for the first time, though many years elapsed before it met again) in terms very similar to and in parts identical with the letter of A. Z. It is not likely that it produced much effect on "Her Majesty's Parliament of Science," as some one christened the Association at this its first meeting in Queen Victoria's reign; because the Association through its Council had already decided to act, and had drawn up a full and sufficient expression of the demands of the leading scientific men of the day. A committee consisting of Sir John Herschel, and Professors Whewell, Peacock and Lloyd was appointed to lay before Government a memorial embodying the resolutions passed by the Association. This memorial was the charter of the expedition which resulted from its adoption and we may quote the three most important resolutions it contained:

"Resolved, 1. That the British Association views with high interest the system of simultaneous magnetic observations which has been for some time carried on in Germany and various parts of Europe, and the important results to which it has already led; and that they consider it highly desirable that similar series of observations, regularly continued in correspondence with and in extension of these, should be instituted in various parts of the British dominions.

"2. That this Association considers the following localities as particularly important: Canada, Ceylon, St. Helena, Van Diemen's Land, and Mauritius, or the

190 SIEGE OF THE SOUTH POLE

Cape of Good Hope; and that they are willing to supply instruments for their use.

“4. That the Association considers it highly important that the deficiency, yet existing in our knowledge of terrestrial magnetism in the southern hemisphere, should be supplied by observations of the magnetic direction and intensity, especially in the high southern latitudes between the meridians of New Holland and Cape Horn; and they desire strongly to recommend to Her Majesty's Government the appointment of a naval expedition expressly directed to that object.”

The committee lost no time in approaching Government for on September 3rd the Prime Minister, Lord Melbourne, wrote making an appointment to receive them on November 10th. On that day some informal conversation took place, the presentation of the memorial being postponed to November 29th, when the Chancellor of the Exchequer was also present. The Prime Minister referred the memorial to the Royal Society, then as now, the acknowledged advisor of the Government on all scientific matters, and it seems to have excited some surprise at the time that the President and Council of the ancient society “casting behind them every feeling but an earnest desire to render available to science the ancient and established credit of their institution,” warmly supported the representations of the young Association which had rushed in where the more august body hesitated to tread.

All was now plain sailing. Lord Melbourne decided on the despatch of an expedition, the Lords of the Admiralty set apart two ships well suited for the purpose, the Chancellor of the Exchequer supplied ample funds, the Royal Society appointed a Committee on Meteorology

and Physics which drew up an admirable programme of scientific work, and before the American expedition had reached the southern ice, though after D'Urville had completed his appointed exploration in the Antarctic regions, the British expedition was being fitted out.

The complete scheme sanctioned by Government included the establishment of magnetic observatories at Toronto, St. Helena, the Cape of Good Hope and Hobart Town, which were to remain in activity during the period of the Antarctic cruise so as to obtain simultaneous observations over a large part of the southern hemisphere. The scheme was thought out completely and full instructions drafted by the hearty coöperation of the whole scientific world. The British expedition differed from the others already in the field by the singleness of its aim and the perfect adaptation of the means employed to secure the ends intended. No doubt the rivalry between the three expeditions made each the keener in its work; but unfortunately it went too far to be altogether beneficial from the point of view of the advancement of science. Had the three great expeditions of France, the United States and Great Britain been arranged to act simultaneously and in concert, with similar equipment and according to a common plan, the results would unquestionably have been far greater than those which were actually obtained. There would also have been less room for the unfortunate criticism by each commander of the action of his contemporaries and their predecessors, a criticism which degenerated into personal charges of professional incompetence of a very painful kind, and somewhat obscured the substantial gains to human knowledge contributed by the various expeditions.

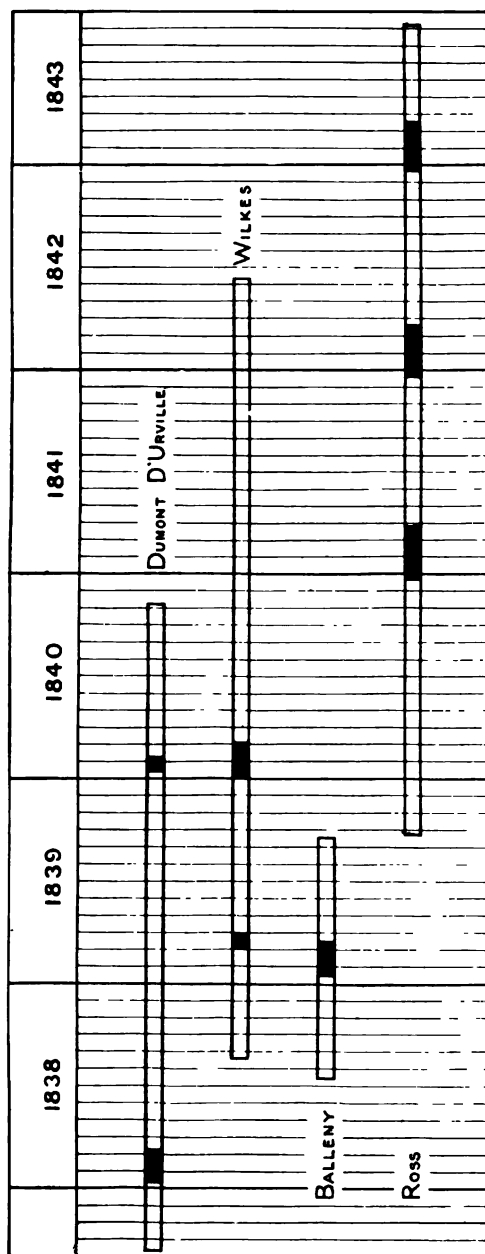
To make it clear how the four expeditions were en-

192 SIEGE OF THE SOUTH POLE

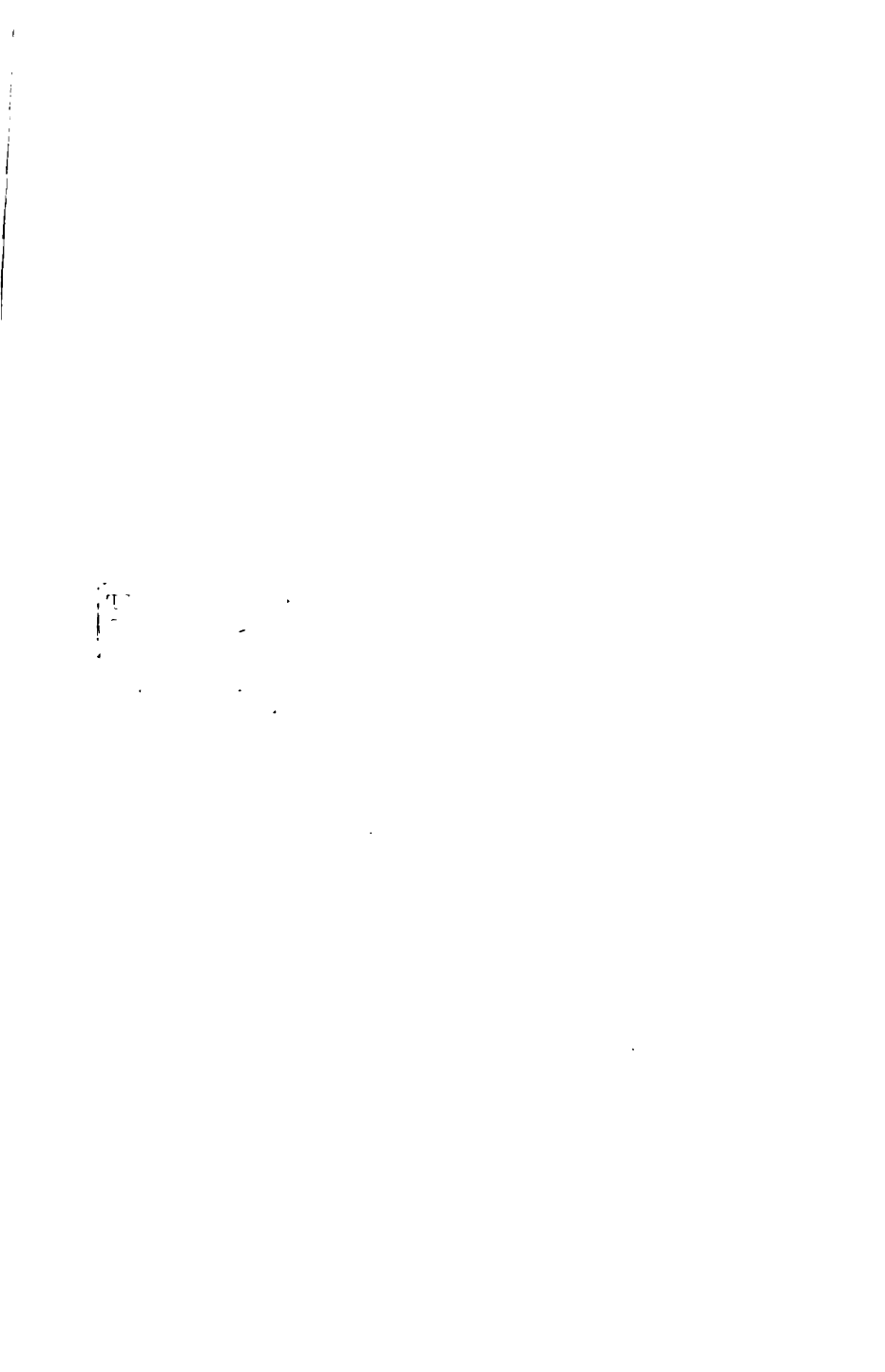
gaged the dates between which each was in the field may be set down in the form of a diagram, reference to which is advisable when reading the narrative of each cruise. The diagram gives a vertical line for each month of the six years, and a double horizontal line is drawn for each expedition across the months occupied by the cruise from the date of leaving the home port to that of returning. The time spent in the Antarctic regions is distinguished by solid black. It will be observed that the French expedition was in Antarctic waters in 1837-38 and again in 1839-40; the American expedition in 1838-39 and 1839-40; Balleny's private voyage took place in 1838-39; and the British expedition spent the three southern summers 1840-41, 1841-42 and 1842-43 in active polar work.

All three expeditions owed much to the revival in the study of Nature which affected all lands alike; but each had its own special characteristics, depending largely on the individuality of the commander. Thus each must be described separately and it may be that in touching on the points of contact—points unfortunately that caused a good deal of friction—some repetition of facts will arise. Each expedition gave occasion to numerous feats of endurance, each abounded in hairbreadth escapes and in opportunities for the display of consummate seamanship, and although success did not smile equally upon the three it is matter for congratulation that none met with disaster but every one achieved something for the honour of its flag.

Synoptic Diagram of the Early Victorian Expeditions.



NOTE.—Each vertical column represents a month; the horizontal bands show the duration of the expeditions by the number of months they run through; the time spent south of 60° S. is indicated in solid black.



CHAPTER X

DUMONT D'URVILLE AND THE FRENCH DASHES TOWARD THE SOUTH POLE

" . . . And as a lance
The fiery eyes of France
Touched the world's sleep, and as a sleep made pass)
Forth of men's heavier ears and eyes
Smitten with fire and thunder from new skies."

—SWINBURNE.

AT the beginning of the nineteenth century the British flag was less known on the Pacific and in the Southern Ocean than the flags of the United States and France. The extraordinary value placed upon whale oil at that period sent fleets of whalers to all parts of the ocean; but British enterprise had marked the Arctic seas for its own and comparatively few ships were engaged in the lengthy voyages of the sperm whaler. This work employed many French vessels and voyages of three or more years in duration were common from the whaling ports of France. It was the custom of the French Ministry of Marine to send a frigate on a tour of the world to visit the whalers at their headquarters on the various desolate islands in the south temperate zone, bringing them supplies, furnishing medical advice, punishing delinquents, hunting up shipwrecked mariners and in every possible way reminding the wanderers that they were citizens of the republic, or subjects of the empire or monarchy as the case might be, and that wherever they wandered they belonged to France and were not forgotten by the fatherland. In this way the countrymen of De Gonneville, Bouvet,

194 SIEGE OF THE SOUTH POLE

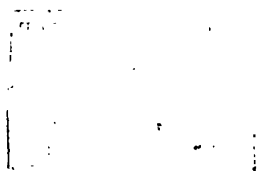
Marion and Kerguelen preserved the historic continuity of French interests in the southern hemisphere. And not in this way alone. More than one great expedition for scientific exploration of the Pacific Ocean was fitted out in France, a country which always—even when the worst passions were raised against his land—cherished a devoted admiration for the work of James Cook such as one nation rarely extends to the subject of another.

The expedition of La Pérouse in 1785-88 and the mystery which enshrouded its fate increased the interest of the French people in the Pacific to a pitch not now easy to realise, and the successive search expeditions of Bougainville and d'Entrecasteaux kept that interest alive for many years.

Amongst French naval officers of that period the glamour of the Great Ocean seemed to dominate the life of one in a preëminent degree, and indirectly led to an important step in Antarctic exploration. At the age of sixteen Jules Sebastien César Dumont D'Urville after failing to enter the Polytechnic, joined the navy. From childhood he had been devoted to the study of travels and especially of voyages of exploration, and he rapidly distinguished himself by his remarkable powers as a linguist, and his enthusiastic interest in various branches of science, especially ethnology. He was destined to touch history in several points curiously remote, but all embraced in the duties or opportunities of a naval officer. When engaged with the fleet in the eastern Mediterranean in 1820 the French consul in the island of Melos took him to see an old Greek statue recently unearthed, and Dumont D'Urville wrote home in terms of such rapturous appreciation of its beauty that an order was sent to secure the statue for the Louvre at any cost. To the majority of



Admiral Dumont D'Urville.
(From D'Urville's *Atlas*.)



cultured mankind the discovery of the Venus de Milo will probably be held the crowning glory of a life; from the point of view of this volume we can refer to it merely as a picturesque incident.

Returning to Paris in 1821 D'Urville joined with Duperrey and others in founding the Paris Geographical Society, now the oldest association of the kind and always one of the most active in promoting the science of the Earth. The two naval officers drew up plans for a scientific voyage of circumnavigation which were approved and they were appointed to carry it out on board the *Coquille*, on which service D'Urville was at sea from 1822 to 1825. He was not altogether satisfied with the result. He considered that some branches of science in which he was particularly interested had been unduly neglected and he planned another expedition to the islands of the Pacific by which this wrong would be redressed. This also was approved, but the Ministry of Marine imposed upon it the additional duty of seeking out the recently reported traces of the ships of *La Pérouse*. The *Coquille* was again placed under D'Urville's command but at his urgent request she was rechristened *Astrolabe* in memory of one of *La Pérouse's* vessels. For three years, 1826 to 1829, Dumont D'Urville was at sea on this great mission in which he was entirely successful, discovering the wreck of *La Pérouse's* ship and recovering many relics of the explorer. On his return he settled down to prepare the description of the voyage, a work extending to twenty volumes.

When deep in the congenial task he was rudely interrupted by the revolution of 1830 and had to perform the ungrateful duty of escorting King Charles X. from France. By a strange coincidence D'Urville had been an officer on the ship which brought the Orleans family

196 SIEGE OF THE SOUTH POLE

back to France on the fall of Napoleon. And so he sped the parting King on his way to the dignified seclusion of Holyrood, where the banished monarch lived some years in the historic palace of those Stewarts whose exile in France had been brightened by the hospitality of his ancestors. D'Urville executed his mission in a manner which gave rise to much unpleasant criticism from the parties both of the old King and the new. The captain was not a diplomatist; his nature was acknowledged by his friends to be brusque and morose, though lit by a southern enthusiasm that laughed at real difficulties.

From whatever cause there now intervened a period of eclipse if not of disgrace. The seafarer retired in 1835 to Toulon where he brooded over his plans for completing the gigantic task of studying the ethnology of the Pacific Islands and fell into such poor circumstances that he was compelled even to stop his subscription to the Geographical Society. The Society chivalrously declined to lose so distinguished a member and placed him on the honorary list.

The Ministry of Marine no longer favoured voyages of discovery and the explorer who had spent his life afloat felt himself stranded and deserted. A change occurring in the government Admiral Rosamel became Minister of Marine and D'Urville hearing a good report of his character and disposition resolved to make another attempt to carry out his favourite scheme of an anthropological expedition to study the Pacific Islands; "I have the vanity," he said, "to believe that few men to-day know Oceania as I do," and in this he was right.

The proposal was well received at the Marine and the plans prepared by D'Urville were submitted to King Louis Philippe in due course. We have D'Urville's word for

it that the King himself proposed an important preliminary operation, nothing less than a trip into the Antarctic seas to surpass the record of Weddell toward the South Pole. How far this was a whim of the Citizen-King we cannot tell; but it seems more likely to have been the plan of some official personage or man of science prudently presented through His Majesty. Baron Humboldt was frequently at the court of Louis Philippe throughout his reign and is known to have been on terms of personal intimacy with the French King, so that it seems highly probable that the author of the letter to the Duke of Sussex urging the British Government to establish magnetic stations, was also responsible for the addition to D'Urville's plan. The additional commission was accepted by D'Urville without enthusiasm. He was not at all sanguine as to the result of an Antarctic cruise and in an address to the Paris Geographical Society in 1837 he said :

"If the enterprise is bold and perhaps impracticable for certain spirits, it is at least honourable to attempt it, and whatever be the result it must at least give occasion for interesting observations."

By this time the fact that an American expedition was nearly ready to set out was known to D'Urville, and at the same meeting of the Paris Geographical Society at which he announced his own plans he presented a full translation of the letter of A. Z. to the President and Council of the Royal Geographical Society of London which curiously enough is now only accessible in this form, the original publication having been only by a privately-distributed pamphlet.

No serious steps were taken to fit the two vessels set apart for the service to navigate an ice-infested sea.

198 SIEGE OF THE SOUTH POLE

Some attempt to plate the bows with metal is recorded but it proved ineffectual and the whole plan of a man-of-war of the period with the sides pierced by great square ports for guns was unfavourable for navigation with any degree of comfort in high latitudes. The ships were two corvettes, the *Astrolabe*, of which D'Urville once more took command and the *Zélée*, under the command of Captain Jacquinot. The Paris Academy of Sciences gave elaborate instructions as to the scientific observations which it was most important to make throughout the voyage and especially in the far south; but it was evident that the sympathy of the commander was with the human rather than the physical group of sciences, and that the honour of France was the leading motive that led him to struggle with the polar ice. His health was not good, indeed he was a martyr to gout; and he himself told with infinite humour how on the first occasion when he hobbled down to his ship as she lay in harbour he overheard a sailor remark: "Oh, that old chappie won't lead us very far,"* and how he grimly resolved to lead his crew a great deal farther than any of them would care to go.

The ships sailed from Toulon on September 7th, 1837 and made their way southward through the Atlantic to Magellan Strait where they worked for some time at the survey of that miserable channel, the despair of every sailor who shunned the Scylla of Cape Horn to fall into its Charybdis. Early in January, 1838, D'Urville set out for the south with the object of repeating Weddell's famous voyage, and securing for France the glory of getting still nearer to the pole. This service had been specially put before him by the King and the portion of the

* "Oh ! ce bonhomme-la ne nous mènera pas loin !"

Antarctic region south of South America was the only part which his instructions required him to explore. There was little to chronicle until January 22nd, 1838, when the ships reached the edge of the ice-pack in $63^{\circ} 39'$ S. and $44^{\circ} 47'$ W. Unfortunately the ice-pack was very close, or perhaps appeared so to the inexperienced eyes of the French officers; but at any rate the ships did not penetrate the pack or approach within a considerable distance of the Antarctic circle between the meridians where Weddell had made his farthest south. D'Urville was not a little annoyed at this check; as he had failed, he began to think that Weddell could not have succeeded, and he made what old Dalrymple would have termed "groundless and illiberal imputations" on the common honesty of the daring sealer. The *Astrolabe* and *Zélée* hovered about the region for nearly two months, now and again finding their way northward to the South Orkney Islands, now and again returning to the edge of the pack, once indeed being surrounded by ice and getting free with difficulty, experiencing the usual miserable weather of those latitudes and making a great number of minute and often interesting observations on the appearance and movements of the ice. An artist of real talent was amongst the staff and his drawings of the icebergs and flocs splendidly reproduced in the volumes describing the cruise are remarkably faithful and beautiful.

On February 27th, 1838, when to the southwest of the South Shetlands the ships sighted land in 63° S., unquestionably part of the same land that had been seen by Palmer and Biscoe although on account of the frequent fogs, the general uncertainty of all determinations of position in polar regions and the sketchy nature of the charts in his possession D'Urville cannot altogether be blamed for

200 SIEGE OF THE SOUTH POLE

supposing that it was a new discovery. However, his own account of the subsequent examination of the coast shows a lack of enterprise which cannot but be deplored. The land was followed toward the northwest and found to consist of two mountainous snow-covered islands. The larger, which was dutifully named Louis Philippe Land, appeared to be separated from the Trinity or Palmer Land of the charts by a strait called Orleans Channel which was seen but not navigated as the season was now far advanced, although as far as can be gathered from the narrative it was by no means blocked by ice. The two highest mountains were named after the two captains of the French expedition, and another after Bransfield the first navigator of the channel between the South Shetlands and Louis Philippe Land. The smaller island to the northwest was named Joinville Land; but no land exploration was undertaken nor collections of any kind procured from the shore.

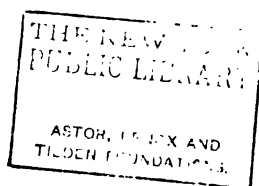
On March 5th the season for southern navigation was so nearly over that D'Urville felt fully justified in leaving the icy waters and pursuing the main object of his expedition in the Pacific Ocean. There in much more congenial surroundings he spent the greater part of two years and gave a very good account of his time when so employed.

Before the end of his great voyage D'Urville resolved once more to make an attempt to penetrate the Antarctic ice. He took this task upon himself in excess of his instructions, being led to do so in the virgin field south of 60° S. between 120° and 160° E., by the probability of finding the magnetic pole in that neighbourhood; and as he frankly states in his official report, by the competition of the expeditions of Ross and Wilkes directed to that par-



The Astrolabe and Zelée in the Ice.

(From D'Urville's *Atlas*.)



ticular area. The last motive, there is little reason to doubt, was the strongest of the three. Although apparently fully informed as to Ross's plans he says that he had then no idea that Balleny had anticipated his intended voyage. France, he thought, might still be in time to share the laurels.

At the end of 1839 the *Astrolabe* and *Zélée* were lying at Hobart Town and the Commodore formed his plan of sailing southward and exploring some part of the region between 120° and 160° E., where the parallel of 60° S. had not been crossed by Cook, Bellingshausen or Biscoe. D'Urville declared in his published journal that his only object was to find at what latitude the solid ice-pack was to be encountered and then to cruise along the edge of it returning to the Auckland Islands or some port in New Zealand.

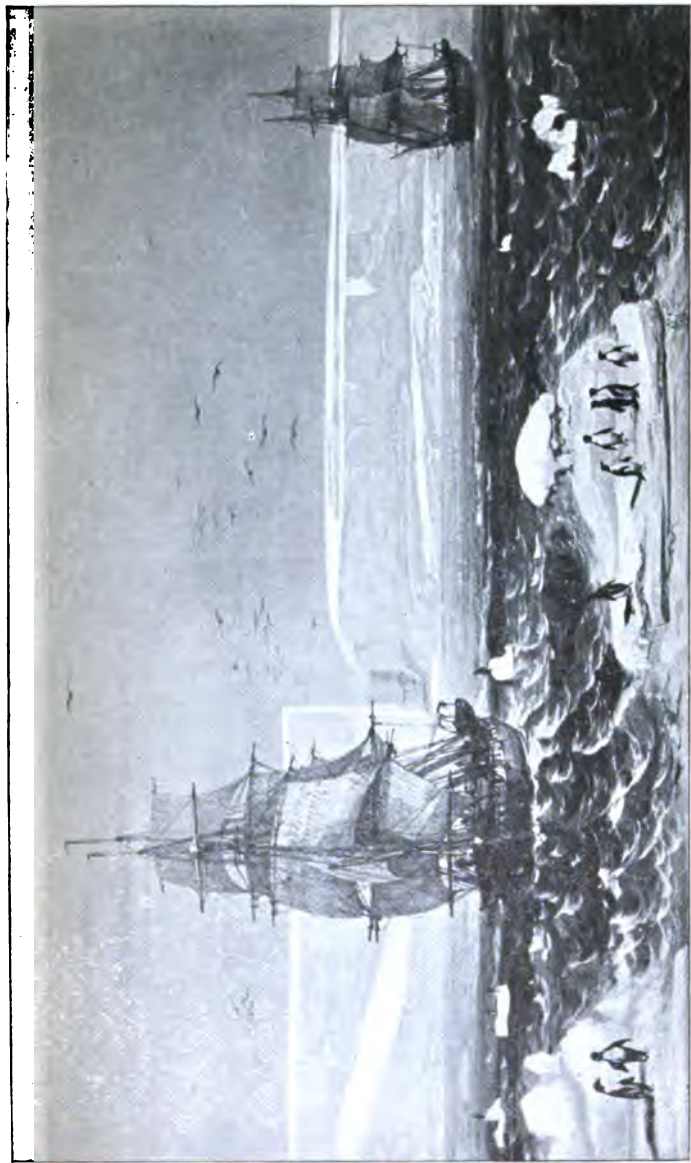
The corvettes sailed on January 1st, 1840, the day of the death of M. Goupil, the artist, who died on shore where a considerable number of the crew of both ships remained in hospital. The vacancies were filled by English sailors obtained with great difficulty and ready in the Commodore's opinion to desert at a moment's notice. The course was set S. E. in order to reach the magnetic meridian or line of no variation and advance southward along that line, for D'Urville was now filled with a burning desire to advance the science of terrestrial magnetism. On the 11th, the fifty-first parallel was crossed close to the position assigned in the charts to Royal Company Island of which no sign was seen, and about this time the albatrosses which had convoyed the ships from Hobart Town ceased to follow.

The first ice was met on the 16th in 60° S., and two days later in 64° the Commodore, struck with the clearness

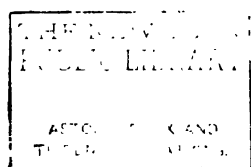
202 SIEGE OF THE SOUTH POLE

of the sea, was gratifying himself with the anticipation of reaching the seventieth parallel without obstruction when a number of ice-islands appeared and brought with them a foreboding that land would be found to bar the way. The ice-islands were large, tabular, with unbroken edges showing no marks of erosion by sea-water but as fresh as if only broken off yesterday from some ice-covered land. Petrels, penguins, seals and a whale were observed, all hailed as signs of land. The weather had turned fine, the sun shining with dazzling brilliancy on the crystal walls of a fleet of ice-islands produced magical and charming effects, and there was not a man on the sick list in either ship when the corvettes crossed the sixty-sixth parallel on January 20th and the crews prepared to celebrate the passing of the circle in proper style. Captain Dumont D'Urville had received a formal notice that Father Antarctic would visit him next day, and like a good fellow had replied that he would be the first to submit to any initiation ceremonies. A postillion mounted on a seal received the welcome answer amid a deluge of rice and beans in place of the "ablutions which are only supportable under the torrid zone" usual on crossing the line. However the night brought an event more remarkable than the preparations for the frivolities of the men, nothing less than the discovery of land. The officers thought several times during the day that they saw an appearance of land more substantial than those which had often deceived them for a time, but at 10.50 p. m., when the sun at length touched the southern horizon it showed up an unmistakable sharp outline on which the attention of everyone on board was riveted.

Next day the weather was magnificent, but there was no wind and the two ships lay with flapping canvas pow-



D'Urville's Expedition amongst the Ice Islands.
(From D'Urville's *Atlas*.)



erless to move though the sea was clear, dotted only by ice-islands harmlessly drifting toward them across the unattainable circle. D'Urville suffered the tortures of Tantalus, he says, for the land stretched as far as the eye could reach to the southeast and the northwest with an apparent altitude of from 3000 to 4000 feet; no prominent summit broke the uniformity of the sky-line, no trace of earth or rock was visible and the shore was an unbroken vertical cliff of ice so like that of the floating ice-islands that no one on board could for a moment doubt that the bergs were simply broken off from the land ice. So clear was the atmosphere that the snow covering the gently receding slopes of the ice-covered land was seen to be thrown into waves like those formed by the wind in desert sand.

Father Antarctic evidently got tired of waiting for the corvettes to enter his domain; and during the idle calm of the forenoon he appeared on board in all his pomp surrounded by a retinue of penguins and seals, while a swarm of sea-birds flew screaming round the becalmed ships. A mock religious ceremony was held, including a blasphemous sermon which would have horrified the commanders of the other expeditions had they known of it, and terminating in a banquet where wine flowed freely and the ships resounded with mirth, but everything "passed off perfectly well and there was not the least disorder." Every officer and man having paid his footing the portals of the Antarctic were thrown open; and with the rising sun of January 21st "a pretty little breeze" conducted the ships along the newly discovered coast through an avenue of "those palaces of crystal and diamonds so common in fairy tales." The rare days of perfect weather in the far south were never before so fully appreciated or so vividly

204 SIEGE OF THE SOUTH POLE

described as by the impressionable French commodore, his official report being even more picturesque in its descriptive colouring than the more popular account of the voyage edited by other hands.

The ships, wafted by a light breeze, steered eastward along the coast which was only five or six miles distant, the sailors shouting at their best in reply to the hoarse cries of the startled penguins. At noon a good observation gave the position as $66^{\circ} 30' \text{ S.}$ and $138^{\circ} 21' \text{ E.}$ The dipping needle showed an inclination of 86° and the compasses were moving wildly, no two agreeing together. It seemed as if the magnetic pole lay no great distance inland from the coast which ran from east to west along the Antarctic circle. The fairy palaces of floating ice sometimes came inconveniently near, and the ships seemed to be threading the narrow streets of a city of giants. The orders of the officers were echoed and re-echoed mockingly by the vertical walls of ice, the sea rushed roaring into the ice-caves along the water-line setting up eddies that would have seriously menaced the vessels had the breeze dropped. The steady heat of the sun was melting the snow on the flat tops of the bergs and cascades of water poured down their sides. One floating berg was dark-coloured as if mixed with earth.

The magnetic observers were impatient to land while the fine weather lasted either on the coast itself or on an ice island, and at last at 6 p. m. a berg was noticed sloping gently to the water's edge to which MM. Dumoulin and Coupvent with their apparatus were safely conveyed in the whaleboat. They reported that the bergs were all afloat and the instruments showed that they were subject to a very perceptible drift. This proved that the

sea was of considerable depth but soundings beyond 100 fathoms could not be taken from the corvettes because "unfortunately all our sounding lines were almost useless." While the corvettes were laying-to waiting for the return of the magnetic party and testing the useless sounding lines, the officer of the watch on the *Astrolabe*, M. Duroch, caught sight of unmistakable rocks on the shore. A second boat was got out under his command and the *Zélée* not to be behindhand sent a boat also under M. Dubouzet. The two crews pulled hard for the honour of being the first to reach the land and an exciting race was the result. The *Astrolabe's* boat had a good start and reached the nearest islet a few minutes before the other. The islet was one of a group of eight or ten lying in a chain a few hundred yards off the ice-cliffs of the coast. There was a considerable surf breaking on it, but the men succeeded in landing and made prisoners of the previous inhabitants, a troop of non-resisting penguins. Following the ancient custom "faithfully kept up by the English" the tricolour flag was run up and the land formally annexed to France; a bottle of Bordeaux was emptied in honour of the great occasion and then all hands were set to work to collect scientific specimens. The animal kingdom was represented only by the penguins not a shell of any kind was to be found on the rocks, not even a trace of lichen could be discovered and a diligent search revealed only one dry seaweed that had probably been carried by birds. The only thing to be found was the rock itself and pieces of that were soon knocked off as specimens. It was noticed that fragments of stone obtained from the crops of penguins killed the day before were of exactly the same kind of rock (D'Urville calls it a granite of various colours) as that which

206 SIEGE OF THE SOUTH POLE

composed the islet, and this suggested the utilisation of birds in such conditions as geological collectors.

At 9.30 p. m. the boats left the islet and got safely on board the corvettes two hours later, the sinking of the sun bringing on a very cold night with a temperature of 24° F., which sheathed the oars and the outsides of the boats with ice. The first cape seen on the icy coast was named Cap de la Découverte, that near the landing place Pointe Géologie, and the land as a whole was named Terre Adélie, as the gallant but garrulous leader puts it in his official report: "This name is destined to perpetuate the memory of my profound regard for the devoted companion who has three times consented to a long and painful separation in order to allow me to accomplish my plans for distant explorations. These thoughts alone have urged me on in my naval career since my most tender childhood. On my part, then, this is merely an act of justice, a sort of duty which I perform, from which no one could possibly withhold his approbation."

For two days the ships slowly proceeded to the eastward along the land to which closer observation now enabled the more reasonable height of 1500 feet to be assigned as a maximum. In $135^{\circ} 30'$ E. the edge of the pack was found running from south to north barring the way to any further eastward advance, and on the 24th, as the ships were working their way northward between the drifting bergs, they were struck by a sudden gale and separated. The Astrolabe had her mainsail torn to ribbons and there was the greatest anxiety for the safety of her masts, but both corvettes weathered the storm, escaped collision with the bergs, and met again next day, though more damage had been done to their



Hoisting the French flag on Adélie Land.

(From D'Urville's *Atlas*.)

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ASTOR, LENOX AND
TILDEN FOUNDATIONS

rigging in twelve hours than in the previous six months. The ships went north to nearly 64° S. to clear the ice, and then, on the 28th, once more turned southwestward, and on the 29th, nearly in 65° S., a solid pack was again seen to the south. The weather was still bad, the wind blew strong from the east, and frequent fogs made navigation amongst the ice very difficult.

In the afternoon when in about 65° S. and 135° E. just as the *Astrolabe* was going to set more sail to clear a berg, which loomed up out of the fog, a strange sail was sighted running towards the French vessels. She was a brig flying the American colours and D'Urville immediately realised that she was one of Wilkes's squadron, bound on a similar service to his own. The tricolour was hoisted at once, the order to make more sail delayed to allow the stranger to come up with the *Astrolabe*; then as the American brig was moving so quickly through the water the delayed order was given and the *Astrolabe* shot forward in order says D'Urville, to keep up with her and have a longer time for speaking; but the American evidently thought the Frenchman was trying to run away, and turning sharply southward was lost in the fog without exchanging signals. D'Urville does not mention this episode in his official report, but in the account of the voyage he explains how the misunderstanding arose, declaring that he wished nothing so much as to compare notes with the other expedition and give it full information as to the discoveries of the French ships. But, nettled by the report of Wilkes's comments on the encounter, he goes on to say that while his own conduct was always actuated by perfect frankness towards other explorers, the Americans were always very reserved as to their doings and kept their discoveries a profound secret. This, as we shall see,

208 SIEGE OF THE SOUTH POLE

was not really the fact, although Wilkes's instructions actually enjoined such secrecy upon him; and no doubt both commanders were far better fellows than either supposed the other to be.

In 131° E. and $64^{\circ} 30'$ S. a solid wall of ice was seen to the southward and all day on January 30th the ships sailed along a coast similar to that of Adélie Land. From a distance of three or four miles it was seen to be a line of vertical ice-cliffs from 120 to 130 feet high. A sounding was taken with 200 fathoms of line and no bottom found. The ice-barrier was perfectly horizontal on the top, showing no appearance of mountains behind it nor of rocks in front; but judging from analogy with Adélie Land D'Urville decided that so great a mass of fixed ice must either envelope land, or a group of rocks, or at least must rest on an extensive shoal lying off the coast of a land existing farther to the south, and in this belief he named it Côte Clarie after Madame Jacquinot.

Next day, the course having been followed to the westward, the ships lost sight of the solid barrier and were confronted by an ordinary ice-pack through which there was no inducement to try to penetrate. A last attempt was made to get magnetic observations on an iceberg, but it was impossible to effect a landing. D'Urville felt that his task was now fulfilled. He was himself in bad health and constant suffering, and though he believed that the greater part of the Antarctic circle was surrounded by land which might be reached by anyone bold and fortunate enough to penetrate the surrounding ice-pack, he thought it would be cruelty to force his exhausted crews to fresh exertions. At any rate they had now learned that the "old chappie" was able to lead them farther than they wished to go. So on February

1st, 1840, the French flag retired from the South Polar Seas and the part played by France in the long history of the Antarctic came to an end for the nineteenth century.

D'Urville was led to make his second dash to the south by the hope of anticipating the labours of Ross, and as Ross did not care to visit those parts after the French and American expeditions had cruised through them, the resolution of the French captain quite possibly led to the postponement rather than the advancement of discovery; since one expedition under an experienced ice-navigator with specially fortified ships and selected crews could certainly do more than two or any number of expeditions in ill-found vessels manned by inexperienced and enfeebled men.

D'Urville's discoveries of land were of but little account. He twice traced out considerable stretches of a solid barrier of ice, and at one point saw and landed upon rocks in front of it; but he could only give the vaguest account of what lay behind the barrier. Perhaps the best part of the work of the *Astrolabe* and *Zélée* in the far South is the vivid and fascinating description of Antarctic scenery, and the splendid illustrations which accompanied the volumes describing the expedition.

The French expedition continued its researches in the Pacific where the commander was at home, an enthusiast riding his hobby to his own infinite satisfaction and to the advancement of the science of geography. The ships were back in France early in November, 1840, and D'Urville at once set himself to the task of editing the record of the cruise. He was promoted Rear-Admiral and appointed President of the Council of the Paris Geographical Society in December, 1841, an honour which much gratified him.

210 SIEGE OF THE SOUTH POLE

On May 8th, 1842, he yielded very reluctantly to the entreaties of his wife and son to leave his work and take a little holiday to see the fountains playing at Versailles. As the party was returning an accident happened, the train caught fire and all three lost their lives, the charred remains being identified with the utmost difficulty. It was remembered that half a century before while an infant Dumont D'Urville had fallen into the fire and been rescued not a moment too soon, a tragic coincidence that caught the public fancy for a moment.

CHAPTER XI

CHARLES WILKES AND THE UNITED STATES' EXPLORING EXPEDITION

"There was a Door to which I found no Key,
There was a Veil past which I could not see;
Some little Talk awhile of Me and Thee
There seemed—and then no more of Thee and Me."

—OMAR KHAYYAM.

THE name of John N. Reynolds has already been mentioned as a warm advocate for American exploration in the Antarctic seas. Before the "infant expedition" on the *Seraph* and *Annawan* in 1829-30, he had urged the dispatch of national exploring ships for the survey of the routes of whalers in the Pacific and for discovery in the far south. Congress had considered the matter in 1828, and the House of Representatives requested the President to send out such an expedition. The Secretary of the Navy for the time being adopted the scheme too soon, appointed the U. S. ship *Peacock* for the service and advised the selection of a scientific staff and the purchase of a second vessel and the necessary instruments. He informed the House that the object of the expedition was to examine islands and coasts, both known and unknown, as far south as circumstances, safety and prudence would permit; and he asked for more money. The Senate, displeased at the Secretary of the Navy acting on a resolution of the House alone in a matter which had not come before the more august assem-

212 SIEGE OF THE SOUTH POLE

bly, only sanctioned a small expedition for surveying work in the Pacific.

Reynolds made a cruise in the Pacific, circumnavigated the globe and returned more determined than ever to obtain an expedition on an adequate scale for maritime exploration under the American flag, though on finding the greatest opposition shown to the part of the scheme relating to south polar research he laid more stress on the exploration of the Pacific. The practical importance of this appealed to the popular mind for one-tenth of the American merchant tonnage was embarked in whaling ventures and trade with China on those seas.

The importance of having competent scientific men to take advantage of the opportunities for research likely to be afforded by such a voyage, led the organisers of the expedition to provide liberally for such a staff, on which Reynolds of course expected to have a leading place. This part of the plan was naturally distasteful to the Navy Department, which was by no means sympathetic with the expedition as a whole and adopted the instinctive attitude of the fighting man toward the mere civilian. Unable to prevent the nomination of a scientific staff the Department could at least balk the one enthusiast of the opportunity for which he had worked so long, and "for the sake of harmony" Reynolds was not allowed to go.

The Act of Congress authorising an American Exploring Expedition was at last passed on May 18th, 1836. A squadron was set apart for the service and Captain Ap Catesby Jones, U. S. N., appointed to command it. Lieutenant Charles Wilkes, an American officer of English parentage was dispatched to Europe to consult with scientific men there and to make pur-

chases of the necessary instruments for the expedition. In his absence troubles thickened round the promoters of the expedition, which it is now unnecessary even if it were possible to particularise. On his return Wilkes found that he was expected to act as a member of the scientific corps and not as an executive officer. This he felt, he could not do with honour to himself and he gave up all connection with the expedition, betaking himself to marine surveying.

The Navy Department, while compelled by the Act of Congress to equip the expedition, did so without any heart for the work. The friends of Mr. Reynolds felt that they had a serious grievance, nor did they hesitate to say so, and for two years things went from bad to worse. Jones threw up the command, the next two officers to whom it was offered declined or were unable to accept it. Captain Gregory who got the next offer refused to have anything to do with it as he was a friend of Reynolds and resented the treatment that gentleman had received.

All this time supplies of all sorts were being accumulated without supervision, the ships appointed for the service were surveyed and overhauled in a perfunctory manner, and although the learned societies of the United States, especially the Philosophical Society of Philadelphia, formulated plans for scientific work, there was no one to see that the arrangements necessary for their accomplishment were made.

Discontent had already taken root amongst the idle crews, tired with the long delay. The public were disgusted with the procrastination and vacillation of the authorities and the expedition was denounced as an utter failure before ever it started. At last on March 20th,

214 SIEGE OF THE SOUTH POLE

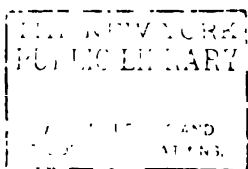
1838, the Secretary of the Navy, passing over several senior officers, gave orders to Lieutenant Charles Wilkes, then forty years of age, to undertake the command and reorganise the whole expedition. Wilkes was much surprised at the appointment, but, after insisting that it should first be offered to all the officers above him in the service he accepted the task, well-knowing that it was beset with more than ordinary difficulties. A month later he was informed that the squadron assigned to him would consist of the sloops of war Vincennes and Peacock, the brig Porpoise and the store-ship Relief, the last being the only vessel of the larger squadron originally intended for the purpose, and although new a very slow ship. Two pilotboats, the Sea Gull and the Flying Fish were subsequently added.

The official orders describing the scope and aims of the expedition were dated August 11th, 1838, and signed by J. K. Paulding of the Navy Department. The following quotations from this document are necessary in order to understand the real object of the expedition and to show how far the ships were intended to work in the polar seas.

“The Congress of the United States, having in view the important interests of our commerce embarked in the whale-fisheries, and other adventures in the great Southern Ocean, by an Act of the 18th of May, 1836, authorized an Expedition to be fitted out for the purpose of exploring and surveying that sea, as well to determine the existence of all doubtful islands and shoals, as to discover and accurately fix the position of those which lie in or near the track of our vessels in that quarter, and may have escaped the observation of scientific navigators. . . . You will accordingly take your



Lieutenant Charles Wilkes, U.S.N.
Commanding the United States Exploring Expedition.
(From the *Narrative* of the U. S. Exploring Expedition.)



departure from Norfolk, and shape your course to Rio Janeiro, . . . determine the longitude of that place, as well as of Cape Frio; after which you will either detach a vessel or proceed with your whole squadron, to make a particular examination of Rio Negro. . . . Having completed this survey, you will proceed to a safe port or ports in Terra del Fuego, where the members of the Scientific Corps may have favorable opportunities of prosecuting their researches. Leaving the larger vessels securely moored and the officers and crews occupied in their respective duties, you will proceed with the brig Porpoise, and the tenders, to explore the Southern Antarctic, to the southward of Powell's Group, and between it and Sandwich Land, following the track of Weddell as closely as practicable, and endeavoring to reach a high southern latitude; taking care, however, not to be obliged to pass the winter there, and to rejoin the other vessels between the middle of February and beginning of March. The attention of the officers left at Terra del Fuego, will, in the meantime, be specially directed to making such accurate and particular examinations and surveys of the bays, ports, inlets, and sounds in that region as may verify or extend those of Captain King. . . .

"You will then on rejoining the vessels at Terra del Fuego, with all your squadron, stretch towards the southward and westward as far as the Ne Plus Ultra of Cook, or longitude 105° W., and return northward to Valparaiso. . . . Proceeding once more from that port, you will direct your course to the Navigator's Group, keeping to the southward of the place of departure, in order to verify, if possible, the existence of certain islands and shoals, laid down in the charts as doubt-

216 SIEGE OF THE SOUTH POLE

ful, and if they exist, to determine their precise position, as well as that of all others which may be discovered in this unfrequented track. When you arrive in those latitudes where discoveries may be reasonably anticipated, you will so dispose your vessels as that they shall sweep the broadest expanse of the ocean that may be practicable, without danger of parting company, lying-to at night in order to avoid the chance of passing any small island or shoal without detection. . . . From the Navigator's Group, you will proceed to the Feejee Islands. . . . These objects will, it is presumed, occupy you until the latter end of October; and when attained as far as may be possible, you will proceed to the port of Sydney, where adequate supplies may be obtained. From thence you will make a second attempt to penetrate within the Antarctic region, south of Van Diemen's Land, and as far west as longitude 45° E., or to Enderby's Land, making your rendezvous on your return at Kerguelen's Land, or the Isle of Desolation, as it is now usually denominated, and where you will probably arrive by the latter end of March, 1840.

"From the Isle of Desolation you will proceed to the Sandwich Islands, by such route as you may judge best, from the information you may acquire from such sources as fall in your way. . . . Thence you will direct your course to the Northwest Coast of America. . . . You will then proceed to the coast of Japan, taking in your route as many doubtful islands as possible; and you have permission to pass through the Straits of Sangar into the Sea of Japan, where you may spend as much time as is compatible with your arrival at the proper season in the Sea of Sooloo or Mindora. . . . Having completed this survey, you will pro-

ceed to the Straits of Sunda, pass through the Straits of Billiton, which you will examine, and thence to the port of Singapore, where it is probable you may arrive about the beginning of April, 1841. . . . Having completed this service, it is presumed the objects of your enterprise will be accomplished, and you will accordingly, after receiving your supplies at Singapore, return to the United States by the Cape of Good Hope, taking such a course as may be most likely to further the great purposes of the expedition."

The foregoing extract indicates the route to be pursued and the general allocation of time. The trips into the Antarctic regions were designed to be short summer cruises, and no preparations were accordingly made for penetrating the pack-ice or for wintering in a high latitude.

A large part of the instructions is devoted to hints for the treatment of savages; the scientific staff of nine civilians was selected with a view to studies in the tropical and temperate zones, and as a matter of fact they were not carried on the Antarctic cruise. The hydrography and geography of the various seas and countries were to be studied by the naval officers to whom were entrusted all researches connected with these departments as well as with astronomy, terrestrial magnetism and meteorology. Wilkes insisted upon this as one of the conditions of accepting the command.

Very stringent orders were given as to the communication of the results of the expedition to outsiders.

"You will prohibit all those under your command from furnishing any persons not belonging to the Expedition with copies of any journal, charts, plan, memorandum, specimen, drawing, painting, or information

218 SIEGE OF THE SOUTH POLE

of any kind which has reference to the objects and proceedings of the Expedition. . . . You will adopt the most effective measures to prepare and preserve all specimens of natural history that may be collected, and should any opportunity occur for sending home by a vessel of war of the United States copies of information or duplicates of specimens . . . you will avail yourself of the occasion . . . at the same time strictly prohibiting all communications except to this Department, from any person attached to the Expedition, referring to discoveries, or any circumstances connected with the progress of your enterprise."

The services of Lieutenant Hudson as second in command of the Expedition were only secured by the express declaration on the part of the government that the Expedition had no military character so that that officer, could without transgressing naval etiquette serve under Wilkes, who was his junior. The scientific staff seems to have been frequently discontented, the exclusion of Mr. Reynolds not appearing to have secured the harmony that was expected. The cause of the discontent was largely due to the fact that the civilians were kept entirely in ignorance of the essential objects of the expedition. Wilkes himself gives this explanation. He scarcely conceals his contempt of civilian men of science, and he appears to have seen nothing wrong in treating them like common sailors in so important a particular. What possible harm could result from the plans of a national expedition being known to those who took part in it is difficult to imagine; the effect of secrecy should have been easy to foresee.

A hint as to other troubles which beset the com-

mander, and of the condition of the crews may be obtained from the following conspectus of the official list of officers and men taking part in the expedition.

There were altogether 83 officers and 12 members of the civilian staff including men of science and artists. In addition to these the five ships sailed with a total crew of 345 men of whom only 221 returned to the United States with the expedition or were sent home on vessels of the United States. Of the remainder 62 were discharged abroad, 47 deserted at various ports and 15 died or were lost in the *Sea Gull*. To take the place of the losses 240 men were engaged at various ports and of these 80 deserted, 8 died, 26 were discharged and 126 were brought back to the United States so that the number at the end of the long voyage was practically the same as at the beginning. That there were 127 desertions out of 585 men engaged, or 22 per cent. of the ships' companies, shows the service to have been far from popular. Many of the officers also were not devoted to their commander and some of them were almost openly antagonistic to him.

Captain Wilkes pointed out before sailing that his requisitions for many necessary stores had been totally disregarded by the Navy Department, and that the vessels had not been properly inspected or repaired before being sent out. The alternatives before him were extremely difficult, either to resign, as the commanders previously designated had done, to delay the expedition until the ships were properly overhauled and equipped and thereby further exasperate public opinion and increase the discontent of the crews, or finally to sail and take the great and unnecessary risks put upon him, in order to save the honour of his country.

220 SIEGE OF THE SOUTH POLE

He chose the last as the least objectionable course, and he found it hard enough.

The squadron was hastily got ready for sea and sailed on the date Wilkes had fixed shortly after his appointment, August 18th, 1838. The ships were as follows:

The Vincennes was a sloop-of-war of 780 tons, originally single-decked, but for the purpose of the cruise a light upper deck was added thus increasing her accommodation to that of a small frigate. This was the flag-ship of the squadron under the command of Lieutenant Wilkes. In addition to her officers she carried six of the civilian scientific staff.

The Peacock was a sloop-of-war of 650 tons, built ten years before and provided with an extra deck like the Vincennes. She had been so carelessly overhauled and so little prepared for a voyage involving exceptional risks that Lieutenant William L. Hudson, who commanded her, reported officially a month after sailing: "Taken as a whole, the Peacock has been fitted out (so far as the navy-yard was concerned) with less regard to safety and convenience than any vessel I ever had anything to do with." She carried four of the civilian staff, including James D. Dana, the mineralogist. It creates no surprise that she did not complete the voyage; she was wrecked on July 18, 1841, though fortunately without loss of life.

The Porpoise, a gun-brig of 230 tons, had been specially fitted with a forecastle and poop-deck for the voyage. She was under the command of Lieutenant Cadwalader Ringgold.

The Sea Gull was an old New York pilot-boat of 110 tons, and served as a tender under the command of

Passed-Midshipman James W. E. Reid. She was lost at an early period in the voyage, about the 1st of May, 1839, and all on board perished.

The tender, *Flying Fish*, was a similar craft, but still smaller, only 96 tons. She was commanded by Mr. Samuel R. Knox, and did not complete the cruise, having been sold at Singapore.

The *Relief* was a store-ship which, although new, was an unwieldy vessel, built only for carrying cargo. She was commanded by Lieutenant A. K. Long and carried two of the civilian staff. She was sent home early in the cruise, having proved a drag on the other ships on account of her slowness.

In command of such a squadron, with such a history, Captain Wilkes set out on a beautiful day with a smooth sea and light wind, but naturally enough a prey to dark forebodings. He says:

"It required all the hope I could muster to outweigh the intense feeling of responsibility that hung over me. I may compare it to that of one doomed to destruction."

On February 17th, 1839, the squadron was united in Orange Harbour, Nassau Bay, in the extreme south of Tierra del Fuego. There the *Vincennes* was left at anchor, the *Relief* was sent to Magellan Strait to carry out surveys, and the other vessels sailed for the Antarctic ice. Wilkes, himself, went in the *Porpoise*, accompanied by the *Sea Gull*, under Lieutenant Johnson, to explore the southeast side of Palmer Land, while the *Peacock* and *Flying Fish* were dispatched to the westward as far as the *Ne Plus Ultra* of Cook in 106° W. Both parties sailed on February 25th, the mind of the leader again greatly depressed with the thought of the difficulties before him.

222 SIEGE OF THE SOUTH POLE

The Porpoise and Sea Gull encountered the first ice-islands on March 1st, and later in the day sighted the northern islands of the South Shetland group. The weather for several days was so thick that it was impossible to attempt a landing. Smoke was seen issuing from the sides of Bridgeman Island, and a strong sulphurous smell was noticed as the ships passed. On March 3rd, Wilkes fixed the position of "the eastern extremity of Palmer's Land or Mount Hope" in $63^{\circ} 25' \text{ S.}, 57^{\circ} 55' \text{ W.}$, a position corresponding to that of the Mont d'Urville of the French expedition, which had visited these waters the year before, of whose proceedings Wilkes, of course, could have had no information. The land was closely beset by ice and the American ships were obliged to keep clear of it. The weather continued abominable and the conditions of life on board were wretched:

"A strong gale now set in from the southward and westward. The brig's deck was covered with ice and snow, and the weather became excessively damp and cold. The men were suffering, not only from want of sufficient room to accommodate the numbers in the vessel, but from the inadequacy of the clothing with which they had been supplied. Although purchased by the government at great expense, it was found to be entirely unworthy the service, and inferior in every way to the samples exhibited. This was the case with all the articles of this description that were provided for the Expedition."

The gale continuing, determined Wilkes to give up all idea of keeping on to the southward and on March 5th, he ordered the Sea Gull to touch at Deception Island and return to Orange Harbour; while he intended to visit the site of the phantom Aurora

Islands. However, incipient scurvy appeared amongst the ill-clad and over-crowded crew so the Porpoise also was headed for Orange Harbour, stopping only to make some deep-sea observations on the way. One of these experiments was made with a wire sounding-line, one of the earliest instances of such an arrangement being used, but it parted at 340 fathoms and the gear was lost. After some adventures amongst the Fuegian Islands, the Porpoise reëntered Orange Harbour on March 30th, where she found the Sea Gull had arrived eight days before. Lieutenant Johnson had spent a week at Deception Island, and had searched for, but failed to find the minimum thermometer left there by Captain Foster in 1829.*

The Peacock and Flying Fish left Orange Harbour on February 25, 1839, with orders to proceed south-westward to Cook's Ne Plus Ultra, the point where the great navigator reached his most southerly latitude in 105° W., and then striking southward and eastward they were to steer to the south of Bellingshausen's route, to pass southward of Peter I. Island and of Alexander I. Land, and so return to Orange Harbour. The achievement fell far short of the plan. The two vessels lost sight of each other in a gale the very day after they sailed, and the Peacock finding that it would waste too much time to beat up to the various rendezvous appointed for a meeting in case of separation, held on her course and met the first icebergs in 63° 30' S. in 80° W. on March 11th, and struggled through an ice-encumbered sea (reaching almost as far as 98° W.

* The thermometer was found by a sealer, W. H. Smiley, in 1842, and the minimum temperature in the 13 years that it had been exposed found to be -5° F.

224 SIEGE OF THE SOUTH POLE

at one time) until on March 25th, she got as far as 68° S. in 95° 44' W. in bad weather and after constant fogs. Here to the surprise of all on board a sail was sighted and proved to be the tender Flying Fish. That little schooner under Lieutenant Walker had been much more successful than her larger consort. She had faithfully carried out the instructions, had visited each of the appointed rendezvous, and then proceeded to 105° W., where on March 21, she was running southward at 8 knots, approaching the seventieth parallel and seemed certain to get beyond Cook's farthest, when ice appeared ahead and the way was barred in 70° S. Next day Walker began to work his way back to the north, and his official report so pithily described his escape from being frozen in, that we quote it verbatim:

"The weather grew thicker and intensely cold, though the thermometer did not fall below 30°; I attributed these changes to the ice to windward, and, believing that we were getting into a clear sea, I stepped below to stick my toes in the stove. I had not been below certainly five minutes when the look-out called to me that the fog had lifted, and that we were surrounded. I jumped on deck, and such was too truly the case; narrow fields of ice with narrow passages of water between, and extending longitudinally in a direction perpendicular to the wind, formed a complete circle round us stretching in all directions as far as the eye could reach, and beyond, icebergs, packed and floating ice. I did not know at first how I should proceed, but after a careful look round, I ran over to the weather shore of the pond, and stood along it in search of a passage that I could not find; but, observing at intervals 'sutures' in the ice, where it did not appear firmly

formed, I resolved to take advantage of this, and if possible force a passage, feeling it necessary at all hazards to extricate ourselves as soon as possible. Having the wind free, I gave her the main-sheet, and manned it well, and having got about six knots way on her, kept close to the ice, and when at the proper distance, put the helm down, hauled the main-sheet forcibly to windward and let fly the head-sheets; this brought her round suddenly before she had passed through sufficient water to deaden her way; the ice cracked, we slipped over, or brushed through, and before eight o'clock we had got into a tolerably clear sea."

When the two vessels met it was evident to both the commanders that it was time to turn northward and Captain Hudson ordered this to be done, magniloquently stating that it required more moral courage to bring his mind to the decision than he could well describe as there was less ice at the moment about them than usual and personal ambition prompted another attempt to get a high latitude.

The whole squadron made for Valparaiso Harbour, where all except the unfortunate Sea Gull safely arrived and proceeded on their cruise in the tropical Pacific in the month of May.

At the end of November 1839 the Vincennes, Peacock, Porpoise and Flying Fish reached Sydney Harbour, the Relief having been sent back to the United States as useless for the purposes of the expedition. Here the naturalists were informed that they would not be required on the second cruise to the Antarctic and advised to devote themselves to the more profitable study of the natural history of Australia and New Zealand.

Vessels worse adapted for the cruise now undertaken

226 SIEGE OF THE SOUTH POLE

would be difficult to find. The larger ships pierced for guns with large square ports could hardly be kept dry between decks in any breeze. The ports were not tight-fitting and in the case of the Peacock the sheer-strake to which they were hung and the bulwarks attached was so rotten as to cause the greatest anxiety. All possible steps were taken to keep the inside of the ships dry. All the openings were caulked, and the seams covered with tarred canvas over which sheet-lead was nailed. On starting the ships' boats were filled with bread as there were not bags enough to contain it all nor proper space in which to stow it.

By this time particulars of the equipment of the British Antarctic expedition had been received at Sydney and the American ships were visited by numbers of the citizens anxious to see what Antarctic equipment was like. Wilkes describes the circumstance with a touch of the grim humour that flickers now and then over the sternest facts in his narrative.

"All seemed disappointed at not being able to see the same complete outfits in our vessels as they had seen described in the published accounts of those of the English expedition commanded by Captain James Ross. They enquired whether we had compartments in our ships to prevent us from sinking? How we intended to keep ourselves warm? What kind of antiscorbutic we were to use? And where were our great ice-saws? To all of these questions I was obliged to answer, to their great apparent surprise, that we had none, and to agree with them that we were unwise to attempt such service in ordinary cruising vessels; but we had been ordered to go, and that was enough! and go we should. This want of preparation certainly did not add to the character for

wisdom of our government, with this community; but they saw us all cheerful, young, and healthy, and gave us the character, that I found our countrymen generally bear, of recklessness of life and limb. The tender *Flying Fish* excited their astonishment more than the ships, from her smallness and peculiar rig; and, altogether, as a gentleman told me, most of our visitors considered us doomed to be frozen to death. I did not anticipate such a fate, although I must confess I felt the chances were much against us, in case we were compelled to winter within the Antarctic. From every calculation, we could not stow quite twelve months' provision, even upon short allowance; our fuel was inadequate to last us more than seven months, and the means of protecting ourselves in the ships for winter quarters, were anything but sufficient. My mind naturally suffered a great deal of anxiety on all these points, and I felt myself not a little depressed by it, particularly when I considered the state of the *Peacock*. . . .

"We made up our minds that it was absolutely necessary for the credit of the Expedition and the country for her to perform it; for we were well satisfied that improper imputations and motives would be ascribed to us if she did not, and was detained undergoing repairs, in a state of inactivity, during the season for operations in the high southern latitudes. The necessity I felt of subjecting so many lives in so unworthy a ship, caused me great anxiety during the whole cruise."

On December 26th, 1839, the day decided upon before leaving home, the squadron sailed from Sydney. On January 2nd, 1840, the little *Flying Fish* was lost sight of in a fog and the opinion was general in the other vessels that she had shared the fate that befell the *Sea*

228 SIEGE OF THE SOUTH POLE

Gull off Cape Horn. Next day the Peacock dropped out of sight, and as the current and wind were unfavourable, Wilkes decided not to visit the first rendezvous at Macquarie Island but to push on to the second, Emerald Isle, or its supposed locality. Here neither ships nor island were to be seen, and on the 10th, the first ice was met with in 61° S. and $162^{\circ} 30'$ E. Two days later the Porpoise vanished from the flag-ship in a fog, and the Vincennes pursued her way alone to the westward amongst floating bergs along the edge of a close ice-pack in 64° .

On the 15th of January the Peacock and Porpoise met, and on the 16th they came up with the Vincennes in $157^{\circ} 46'$ E. longitude, but the latitude is not stated in Wilkes's narrative, though from his chart it is seen to be about 66° S. The sea was much discoloured, but a sounding with 230 fathoms of line from the Vincennes failed to reach the bottom; the Peacock found a depth of 850 fathoms close to the ice. On this day appearances believed to be land were seen from all three ships, and the fact was sworn to subsequently in court. Wilkes



RINGGOLD'S KNOLL.

(From the Narrative of the U. S. Exploring Expedition.)

published the accompanying sketch, which he made of what he himself saw and named Ringgold's Knoll; but it is not stated whether the sketch was made at the time or from memory. He says:

"We ourselves anticipated no such discovery; the indications of it were received with doubt and hesitation; I myself did not venture to record in my private journal the certainty of land, until three days after those best acquainted with its appearance in high latitudes were assured of the fact; and finally, to remove all possibility of doubt, and to prove conclusively that there was no deception in the case, views of the same land were taken from the vessels in three different positions, with the bearings of its peaks and promontories, by whose intersection their position is nearly as well established as the peaks of any of the islands we surveyed from the sea.

"All doubt in relation to the reality of our discovery gradually wore away, and towards the close of the cruise of the Vincennes along the icy barrier, the mountains of the Antarctic Continent became familiar and of daily appearance, insomuch that the log-book, which is guardedly silent as to the time and date of its being first observed, now speaks throughout of 'the land.'"

Wilkes accordingly adopted January 16th as the date of first discovery, although one of the charges subsequently brought against him and disproved, was that on the 19th he stated that he had seen land, well knowing that he had not done so. Unless the latter date was considered of supreme importance it is difficult to imagine how it could have been made the foundation of a charge, even though that charge was proved to be absolutely groundless. Lieutenant Ringgold of the Porpoise, also stated that on January 13th, he was strongly impressed with the belief of the close approach of land. It is quite possible from his position that he caught the distant loom of the Balleny Islands, the existence of which was un-

230 SIEGE OF THE SOUTH POLE

known to the explorers, though they had been discovered twelve months before. The question of priority was made much of by Wilkes, not, indeed, in favour of Balleny, but against D'Urville, who, as we have seen, unquestionably discovered land in the same locality within a few days of the Americans. As the land would have been discovered in any case by one of the expeditions, even if the other had not been in the field, the question is one of purely personal, or at the highest, of national interest, the controversy is of no scientific importance whatever. The prior discovery by Wilkes or D'Urville in no way reduces the credit due to both explorers, although the nature of the new land was only ascertained by either in a vague way.

On the night of the 16th the fog fell thick and the Vincennes suddenly ran from a rough sea into smooth water to the great alarm of the watch below, who, awakened by the sudden stillness, knew that she had come inside a line of ice. She was, in fact, embayed, and it cost several hours of anxious navigation to work her into the rough, open water again.

On the 17th the Peacock was ordered to proceed independently, as the attempt to keep the ships in company was retarding exploration. Both vessels held on their way westward along the edge of the barrier of close pack ice. On the 19th land was very distinctly seen, both to the south-southeast and the southwest, the Vincennes being then in $66^{\circ} 20' \text{ S.}$ and $154^{\circ} 30' \text{ E.}$ The land appeared to rise to a height of about 3000 feet. At night the unusual spectacle was seen of the sun and the nearly full moon, both shining at the same time, the sun "illuminated the icebergs and distant continent with his deep golden rays," while the moon "tinged with silvery

light the clouds in its immediate neighbourhood." The continent was however more distant than the observers thought, for subsequent voyages show that no land larger than a small island can occupy the position assigned.

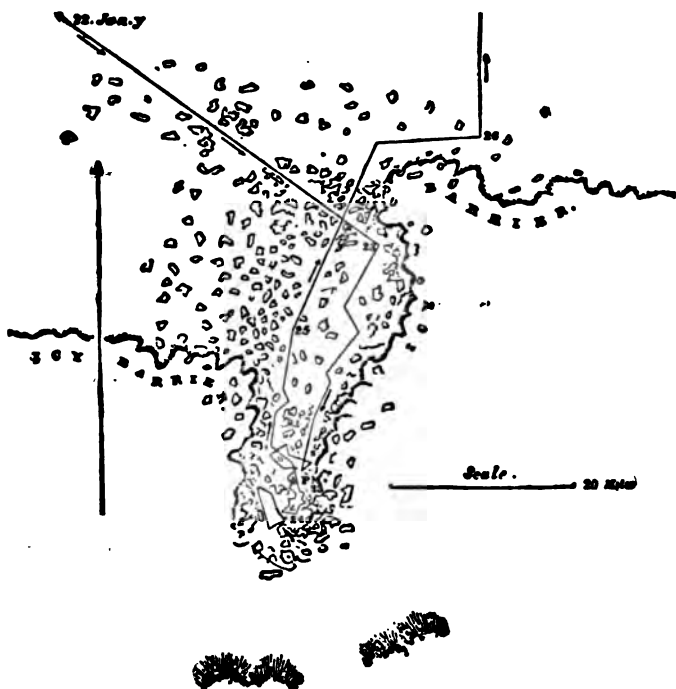
The course along the ice-barrier lay amongst huge flat-topped perpendicular ice-islands, rising from 150 to 250 feet above the sea, and other bergs caverned, split and carved in fantastic forms, the whole resembling a huge city of ruined alabaster palaces with streets of water. On the 22nd, while within sight of land, the Peacock got soundings in 320 fathoms, a confirmation of the vicinity of land, which was much appreciated. Two days later, while attempting to work off the pack, the Peacock went astern and drove backwards into the ice, damaging her rudder so seriously that the ship became unmanageable, all sail had to be furled and after much trouble she was made fast to a berg with ice-anchors. For a time these held, but the wind freshening, they were torn from their hold and her port quarter was driven against an ice-island with a tremendous crash. The rotten state of the upper works of the ship prepared Hudson for the result:

"The first effect of this blow was to carry away the spanker-boom, the larboard stern-davit, and to crush the stern-boat. The starboard stern-davit was the next to receive the shock, and as this is connected with the spar-deck bulwarks, the whole of them were started; the knee, a rotten one, which bound the davit to the taffrail, and with it all the stanchions to the plank-sheer as far as the gangway.

"Severe as was this shock it happened fortunately that it was followed by as great a rebound. This gave the vessel a cant to starboard, and by the timely aid of the jib and other sails, carried her clear of the ice-island,

232 SIEGE OF THE SOUTH POLE

and forced her into a small opening. While doing this, and before the vessel had moved half her length, an impending mass of ice and snow fell in her wake. Had this fallen only a few seconds earlier, it must have crushed the vessel to atoms."

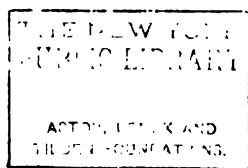


PEACOCK BAY IN THE ICE BARRIER.

For days the ship remained in the direst peril, labouring frightfully in the trough of the heavy sea, grinding and striking against the masses of ice, while her boats made desperate efforts to plant the ice-anchors to control



The Peacock in Peril.
(From the *Narrative* of the U. S. Exploring Expedition.)



her movements. The rudder had been brought on board with difficulty and the carpenters were at work on it trying to repair it sufficiently to allow it to be shipped; Mr. Dibble, the carpenter, was on the sick-list, but he rose from his bed and toiled with his mates for four and twenty hours without intermission to accomplish the herculean task. On the 25th the rudder was hung, though in a very unsatisfactory state, and the ship was at last worked out of the bay in the barrier in which she had so nearly perished. She was in a deplorable condition. In addition to the other damage, her stem was nearly ground off by collisions with the ice. It would have been madness to attempt more, and the only chance of safety lay in an immediate retreat to the north by which, if the elements were kind, she might reach Sydney. On February 21st she arrived at that port with all well on board, after a tempestuous and most anxious voyage. Captain Hudson had shown himself a splendid sailor, cool, resourceful, and never at a loss how to act in the most trying emergencies; and Wilkes gives him unstinted praise for his seamanship, courage, and devotion.

The Vincennes and Porpoise were left cruising westward along the icy barrier. On January 22, 1840, the Vincennes passed the place where the Peacock unfortunately found an opening on the following day, and no break in the line of the barrier was observed. The alternate opening and closing of the ice was attributed by Wilkes to a tide setting along the coast of the Antarctic continent. On the 22nd the sea was found clear to the south and the Vincennes sailed into a wide bay, situated in $67^{\circ} 4' \text{ S.}$ and $147^{\circ} 30' \text{ E.}$, hoping this time to reach the land, but at midnight it appeared that there was no outlet to east or west, and a solid ice-barrier formed the

234 SIEGE OF THE SOUTH POLE

bottom of the inlet which Wilkes named Disappointment Bay. The weather was fine and clear, and next day, long after leaving the bay, the commander found that one of the officers had logged without reporting to him the discovery of a wide opening in the ice at the bottom of the bay. Although sure that no such opening existed, Wilkes put the ship about and sailed back forty miles to convince the officers that Disappointment Bay was really a cul-de-sac in the ice. About this time Wilkes introduced the practise of charting the large ice-islands as he proceeded as if they had been actual islands, believing that their relative positions would not change much in the course of a few hours and that the rough chart might prove serviceable if he had suddenly to retreat from his position.

On January 25th a snow storm came on and the wind shifted to the southeast for the first time since the squadron had reached the ice, a fact that surprised Wilkes, for on the strength of former voyages he had expected easterly winds to prevail in the neighbourhood of the Antarctic circle. The fair wind, come at last, could not be taken advantage of because the weather was unsuitable for making an examination of the coast, which was now fully believed to lie within the southern ice-barrier. The Porpoise was sighted several times on the 26th and 27th, as the Vincennes continued to run to the westward through the scattered ice-islands to about longitude 142° E. Land was distinctly seen on the 28th, and the ship ran towards it for 40 miles through an extraordinary number of ice-islands, varying from a quarter of a mile to three miles in length. At 2 p. m. the barometer began to fall and the weather looked so bad that Wilkes determined to regain the open sea and tried to do so by aid of

the ice-chart constructed on the way ; but the fog was too thick to identify the bergs, and it seemed safer to proceed on the original course. All the afternoon the barometer continued to fall and the gale to increase. Snow storms obscured the view and the spray that broke on board froze as it touched the deck or rigging. The sail was reduced, but not to a minimum, as it was necessary to keep a good way on the ship, and the navigation became very difficult on account of the multitude of bergs :

“ At 10:30 p. m. we found ourselves thickly beset with them, and had many narrow escapes ; the excitement became intense ; it required a constant change of helm to avoid those close aboard ; and we were compelled to press the ship with canvas in order to escape them by keeping her to windward. We thus passed close along their weather sides, and distinctly heard the roar of the surf dashing against them. We had, from time to time, glimpses of their obscure outline, appearing as though immediately above us. After many escapes, I found the ship so covered with ice, and the watch so powerless in managing her, that a little after midnight, on the 29th, I had all hands called.”

For seven hours all hands remained on watch, the ship, all the time, being in the most extreme peril. Intense excitement prevailed on board. The gunner fell on the icy deck and broke his ribs, one of the sailors when aloft got imprisoned on the lee-yardarm by the sail he was endeavouring to furl being blown over the yard, and he was rescued with difficulty, a rope having to be passed round him by which he was hauled, nearly frozen to death, into the top. At one moment the ship seemed rushing on to destruction against a huge ice-island, but

236 SIEGE OF THE SOUTH POLE

a narrow passage between two bergs suddenly appeared and she shot into the treacherous calm of the narrow way, her sails almost thrown aback by the eddy winds from the wall of ice, and the roar of the storm stilled by the distance. The suspense was terrible, but the spirits of the captain rose as he heard the howling of the tempest once more and emerged into the furious sea from the imminence of a terrible death. By 4 p. m. the gale was over, the wind blew from the southwest, and the ship was in 140° E., $63^{\circ} 30'$ S. Wilkes at once started retracing his track to the southward, once more hopeful of reaching the land. The sun rose on the 30th of January and shone brilliantly on a sea beset with ice-islands and bergs of all sizes through which the ship pursued her way easily under full sail, her crew amazed beyond measure to see the labyrinth of ice through which they had rushed before the storm unharmed in the darkness.

The wind quickly freshened and the ship ran into a clear space at the rate of nine or ten knots, finding herself in a bay partly enclosed by ice and partly by rocks, to which the ship approached within half a mile. The land was seen rising beyond the rocks and the barrier to a height of about 3000 feet, and could be distinctly seen extending fully sixty miles from east to west. The position was $66^{\circ} 45'$ S., $140^{\circ} 2'$ E., and soundings gave a depth of only 30 fathoms. The wind had risen again to the force of a gale and it was impossible to lower a boat. Now that all on board were convinced of its existence, Wilkes gave to the land the name of The Antarctic Continent, and to the indentation in which they were that of Piner's Bay, after the signal quartermaster. This was the land which D'Urville also discovered.

Another furious gale struck the ship and she was able to show only a close-reefed main-topsail and fore-storm-staysail, and once more she had to run before it amongst the maze of ice-islands through another dreadful night of watchfulness and fear, this time with added anxiety for the wind was blowing toward the barrier, and with every tack the ship drew nearer the impenetrable ice. At 6 p. m., on January 31st, the wind abated and Wilkes was anxious to return to Piner's Bay, now some sixty miles astern, in order to attempt a landing. Another difficulty arose from an entirely unexpected quarter: The ship's company appeared to the leader to be in very fair health and fit and willing for their work; but two of the surgeons (the third at the time was under suspension from duty) presented a written report to the captain, stating that the health of the crew was so seriously impaired that a few days more of such trying work as they had recently had would increase the sick list to such an extent as to hazard the safety of the ship.

In order to deal with this sudden crisis, Wilkes restored the suspended surgeon to duty so as to get an additional report, and also asked the opinion in writing of the ward-room officers. A majority of the officers supported the medical report, nevertheless Wilkes felt that he would fail in his duty to his country if he relinquished his cruise along the barrier while the sea was open and the crew not absolutely disabled. So after full consideration he did not adopt the advice for which he had asked, and ordered sail to be made to the westward. On February 2nd the ship was sailing along the icy barrier at a distance sometimes as little as $2\frac{1}{2}$ miles, and the high land was seen beyond it. Rows of grounded icebergs were in sight and the water was

238 SIEGE OF THE SOUTH POLE

much discoloured. Greatly to the regret of Wilkes the deep-sea sounding line was in such a bad state that it could only be used to the depth of 150 fathoms, and so failed to reach the bottom. The position of the ship on this day was $66^{\circ} 12' \text{ S.}$ and $137^{\circ} 2' \text{ E.}$

The number on the sick list increased to twenty, and the nights were growing longer, thus increasing the strain and anxiety on the navigating officers. A snow storm and gale came on next day and the sick list rose to thirty. The weather remained wretched until the 7th, and the ship was slowly worked to the westward, sometimes running far to the north to round projections of the barrier or to escape from the proximity of dangerous icebergs. The 7th proved finer and the ship cruised all day along a perpendicular wall of ice about 150 feet in height, stretching without a break to $131^{\circ} 40' \text{ E.}$ and $64^{\circ} 49' \text{ S.}$, where it trended to the south. Behind it the outline of high land could be distinctly seen, the Côte Clarie of D'Urville. The ship lay-to till daylight at the bend in the coast to which Wilkes gave the name of Cape Carr, after the first lieutenant of the Vincennes, but it is not stated whether the cape was the icy angle of the barrier or the assumed promontory within it, and it has even been suggested by an American author that the name applied to the "snowy heights of the mainland," but Wilkes was certainly too good a sailor to give the name of cape to any feature not touched by the sea. Next day it was possible to get only a little farther south but land was visible in the evening at a great distance and the westerly course was continued.

The next two days were the finest experienced on that coast, and fine views of the barrier were obtained, though the appearances of land were neither so numerous nor so

distinct as before. At night a magnificent display of the aurora australis was seen curtaining the northern horizon. On the 12th land was seen again to the southwest, and again hopes were high that it might be reached, but shortly after noon the loose floe ice through which the Vincennes was sailing, changed to a solid barrier. The position then was $64^{\circ} 57' S.$, $112^{\circ} 16' E.$, and the land was distinctly seen as a lofty snow-covered mountain range, showing many ridges and indentations. No soundings were obtained with 250 fathoms, and the ship lay-to for three hours in the hope of finding some opening in the barrier through which the land might be reached. Some of the icebergs showed dark earthy stains. On the 13th high rounded snow-covered land was distinctly seen extending from west-southwest to south-southeast, when the ship was in $65^{\circ} 57' S.$, $106^{\circ} 40' E.$ It was about twelve miles distant and there was no bottom with 300 fathoms. Next day was clear and the land was seen from seven to eight miles distant, extending by angular measurements for 75 miles, and about 3000 feet high. As it was impossible to reach it from the ship, a landing was made on one of the biggest ice-islands from which a large collection of boulders of basalt and red sandstone was made. The largest boulder seen was five or six feet in diameter, but it was not secured, being in an inaccessible position. Parts of the berg seemed to be formed of a sort of conglomerate of rocks cemented together by ice of flinty hardness. All hands showed the keenest interest in the discovery and all were eagerly desirous of possessing themselves of a piece of the Antarctic Continent. The crew enjoyed themselves in sliding on the ice covering a pond of fresh water of over an acre in extent on the top of the ice-island, and on break-

240 SIEGE OF THE SOUTH POLE

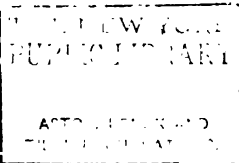
ing this ice a vast supply of the purest fresh water was found, from which the ship replenished her tanks. As this berg was nearly in the position of the last rendezvous appointed for the squadron a flagstaff was erected on it, and orders left for the other ships to continue to the westward until the 1st of March.

On February 15th, the sea became so calm that Wilkes suspected that there might be a quantity of ice to the northward between him and the open ocean, especially as he was 200 miles south of the latitude in which Cook had found the barrier in 1773, but he kept on in the hope of reaching Enderby Land. Animal life was now exuberant, whales abounded, including "right whales" it is stated, and there were seals and penguins in abundance though no mention is made of these being used for food. Enormous numbers of shrimps were seen swimming around the icebergs. Many earth-stained icebergs came in sight and some of them were visited. The meridian of 100° E. had been passed, and the wind for several days showed a distinct diurnal periodicity, blowing fresh from 7 a. m. to 8 p. m., and dying away at night.

On the 16th about 10 a. m., the barrier was seen trending to the northward, and next day it was found that there was no possibility of getting farther to the west. The position then was $64^{\circ} 1' \text{ S.}$ and $97^{\circ} 37' \text{ E.}$, and an appearance of land was seen to the southwest, apparently trending to the northward. This was charted as Termination Land and gave rise to much controversy: it has been proved not to exist in the assigned position, though Drygalski found land which might have been sighted in the same direction from Wilkes's farthest point to the westward. As the wind still held from the east it was



View of the Antarctic Continent from an Ice-Island on February 14, 1840.
(From the *Narrative* of the U. S. Exploring Expedition.)



necessary to beat back against it in order to escape from the great bay into which the Vincennes had entered. This bay abounded in finner whales of extraordinary size, puffing like locomotives and coming much nearer the ship in their total ignorance of the ways of man than was at all agreeable to those on board. The most brilliant aurora was seen at night, and the crew when not at work lay flat on their backs on deck gazing at the magnificent coruscations darting from the zenith to the horizon in all directions with rays of every colour.

The northern side of the great bay in the barrier seemed interminable, the ship having to follow every bend in its sinuous shore in the hope of finding a way out. The sea was as calm as a river, but at length the fears of the crew that they might find themselves cut off were relieved on the 20th in 101° E. by the lift of a slight swell being felt, and soon afterwards the barrier edge turned northward and again westward. After having worked his way back to the eastward against a contrary wind, Wilkes had the disappointment of finding it change to the west as soon as he was free to resume his voyage in that direction. He was anxious to reach Cook's farthest point in the Indian Ocean not 100 miles distant, in order to ascertain whether there had been any change in the position of the ice there.

On the 21st of February, 1840, Wilkes determined to return to the northward. It is curious to notice that after having repeatedly referred to watering the ship from icebergs, he now reduced the issue of water to one-half the usual allowance because there was only a supply for 25 days on board and 3000 miles lay between him and his next port. Probably however the fuel for melting ice was running short.

242 SIEGE OF THE SOUTH POLE

"I have seldom seen so many happy faces," says Wilkes, "or such rejoicings as the announcement of my intention to return produced. But although the crew were delighted at the termination of this dangerous cruise, not a word of impatience or discontent had been heard during its continuance."

The health of the crew was better than when they first reached the ice, but the labour and anxiety had told heavily on Wilkes himself though he was always able to attend to his duties.

On March 1st the Vincennes reached the latitude of Royal Company Island and ran for eight degrees of longitude along the parallel but without seeing any indication of land. The wind proving unfavourable for reaching Hobart Town, Wilkes set his course for Port Jackson, and on the 11th he passed between the Heads and dropped anchor in Farm Cove, Sydney Harbour, the crew being in better condition than when they had sailed. The Peacock was found in Mossman's Cove undergoing her necessary repairs, but there was no news of the Porpoise or Flying Fish, which were not met until March 30th in the appointed rendezvous, the Bay of Islands, New Zealand.

The Porpoise, it will be remembered, was lost sight of by the Vincennes on January 27th in $65^{\circ} 41' \text{ S.}$ and $142^{\circ} 31' \text{ E.}$ Lieutenant Ringgold had formed the mistaken idea that the prevailing wind in those latitudes was westerly, and as it was blowing fresh from the east he thought it would save time to run straight to his western limit in 105° E. , and then in more favourable circumstances examine the barrier minutely as he returned. He accordingly, after a couple of days in the ice during the heavy gale that had so severely tried the Peacock,

stood clear of the ice and held on his course. On the 30th as he was proceeding two strange vessels appeared and as they were smaller than the Vincennes or the Peacock Ringgold concluded that they must be the ships of the British expedition under Ross which he knew were expected in those seas. He hoisted his colours and was "preparing to cheer the discoverer of the North Magnetic Pole," when the strangers showed French colours and the Americans knew that they were D'Urville's. When almost up to the flagship his "intentions too evident to excite a doubt" Ringgold saw sail being made on D'Urville's ship and jumping to the conclusion that an insult was intended he instantly hauled down his flag and bore on his course. Wilkes was much excited when he subsequently heard of the episode and said hard things of D'Urville; but the explanation of the latter has already been given. It is simply incredible that any commander meeting another ship in such a region would wilfully insult a friendly flag, and we must conclude that the American captain was too quick to take offence.

The barrier was occasionally sighted and the usual difficulties of navigation amongst the floating ice were successfully overcome. No land was reported, but discoloured ice was frequently observed and earth and stones were several times collected from the ice; on the 13th a number of stones were taken "from an immense mass of black earth identified with the barrier, some hundreds of yards back from the margin." On February 14th the westward limit assigned had been passed and the Porpoise turned in 100° E. and $64^{\circ} 15'$ S. to examine the edge of the barrier as she sailed eastward. The crew were in good health and spirits and on Feb-

244 SIEGE OF THE SOUTH POLE

ruary 22nd they celebrated Washington's birthday, received a number of compliments from the captain on their good behaviour, and, what comes nearer to Jack's heart, an extra allowance. On the 24th, after having occasionally sighted the barrier, Ringgold felt that he had fulfilled his commission and being then in $64^{\circ} 29' \text{ S.}$, 126° E. , he turned the brig's head northward. The Auckland Islands were sighted on March 5th and on the 7th the Porpoise dropped anchor in the harbour of Sarah's Bosom, where the sailors revelled on the limpets and fish. After a short stay the Porpoise left and reached the Bay of Islands on March 26th, finding the little Flying Fish there before her.

The Flying Fish had been lost sight of by the squadron on the outward cruise on New Years' Day long before reaching the ice. The little schooner had had a mishap with her sails causing her to fall behind. She had proceeded according to instructions to the two first rendezvous without meeting the other vessels, and on January 21st she had reached the icy barrier in $65^{\circ} 20' \text{ S.}$, $159^{\circ} 36' \text{ E.}$ On the 23rd rocks had been seen in $65^{\circ} 58' \text{ S.}$, $157^{\circ} 49' \text{ E.}$ so closely beset by ice that it was impossible to approach them. Until February 5th she continued to cruise amongst the ice, encountering several gales and having a number of men on the sick list. As the crew was reduced by illness it was impossible to reef the mainsail and more than once the schooner had to lay-to with full canvas which caused her to labour frightfully and leak to an alarming degree. Everything below deck was wet and when the pumps were stopped for a short time the water reached the cabin floor. The men sent a letter to Lieutenant Pinkney, who was in command for the cruise, pointing out the deplorable

condition in which they were, saying that they had no dry place in which to lie down and their clothes had been continuously wet for seven days. The officers concurred in the representation and Pinkney himself fully realising the hazardous condition of affairs, gave the order to turn northward on February 5th, and on March 9th, after a rough and dangerous passage, they reached the Bay of Islands, where the scientific staff who had not been allowed to take part in the Antarctic cruise were already assembled and where the rest of the squadron ultimately joined them.

Considering the state of the ships which made this attack on the south polar seas the length of time they were able to pursue their object was remarkable and in the highest degree creditable to the commanding officers. Experience has shown, however, that so large a squadron so heavily manned is not the best instrument of exploration in polar seas. A couple of small stout ships of the Arctic whaler type would undoubtedly have done far more with far less risk than the two French and four American vessels which cruised for two months in those inhospitable waters.

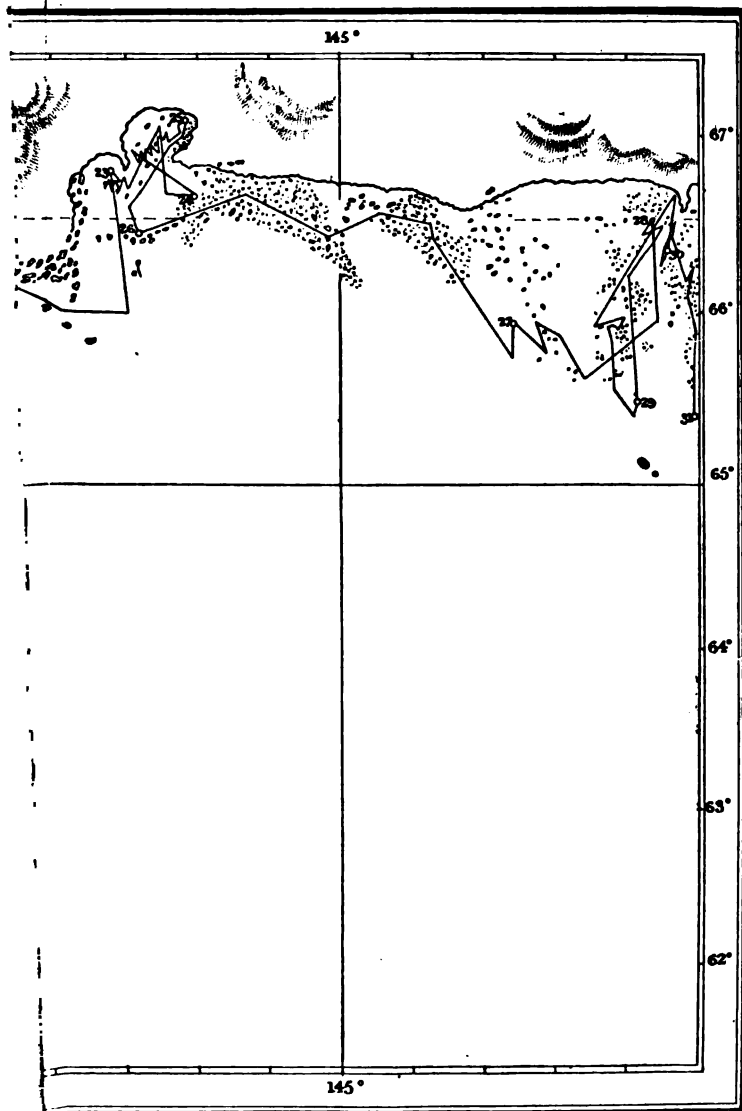
Still a very substantial increase in the knowledge of the Antarctic was made. The Balleny Islands, Sabrina Land and Biscoe's Enderby Land were shown to be connected by patches of high land, which was sighted at so many points as to make it certain that it forms a range of islands, if not a continuous continent. The fact that Wilkes gave the name of Antarctic Continent to this collection of land does not of course prove that it is a continent. In order to demonstrate that it would be necessary to do much more than fix a few points along one coast and the work remains for the future. ✓

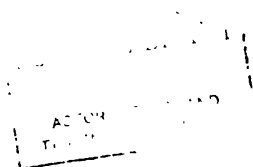
246 SIEGE OF THE SOUTH POLE

While at the Bay of Islands Wilkes wrote to Captain Ross expressing his friendly feelings toward a brother explorer and giving various hints for the navigation of the Antarctic seas as well as particulars of the weather to be expected. He stated that his instructions were stringent as regards communicating the description of discoveries, but at the same time he sent the tracing of a chart showing the position of the ice-barrier and indicating various pieces of mountainous lands within it. Ross received the letter and chart and in the course of his voyage sailed across one of the lands represented in about 66° S. and 165° E., finding only open sea. Having proved that this land—shown in the position where Ringgold on the Porpoise thought he had seen high mountains—was non-existent, Ross declined to adopt any of Wilkes's discoveries shown on this chart, because it was impossible for him to decide how far they represented land actually seen, and how far land, the existence of which was inferred from indirect evidence. Wilkes heard of Ross's voyage towards the end of 1841 when he touched at Oahu in the Sandwich Islands and then explained that the land Ross had sailed over was no part of the American discoveries but a representation of the Balleny Islands, of the discovery of which he had heard in Sydney from Captain Biscoe, whom he met there.* This discovery of Balleny had in the hasty tracing been left without any statement that it was not an American claim, and the lands really claimed for the expedition all lay to the westward of the meridian of 160° , beyond which Ross did not go. Ross however pointed out that

* Wilkes always spoke of Balleny as "Bellamy," and of Biscoe as "Briscoe," slips that give rise to confusion in American writers to this day.

r and of the Discovery added.





the land in question did not correspond to the position of Balleny's discovery, and that it represented a range of mountains in the position in which they were reported by Ringgold and not five small islands. He stated also that Wilkes had seen an exact account of Balleny's discovery in the *Athenæum* on his return to Sydney, and had ejaculated on seeing it, "Then all our labour has been in vain." He therefore suggested that Ringgold's appearance of land may have been laid down on Wilkes's chart and erased from the original after the tracing had been taken. To this Wilkes replied that the position marked on his chart by Biscoe as Balleny's discovery was all the information on the subject that he received before writing his letter, and that the extent of mountainous land shown on Ross's copy of his tracing was far greater than appeared on the original. Wilkes was by no means perfect and committed errors of judgment; but we view his communication to Ross as a friendly and even an unselfish act. He merely carried out his instructions in visiting the portion of the Antarctic region in which he discovered land, and Ross was not justified in including him in the censure, which D'Urville possibly deserved, for having tried to anticipate the work of the British expedition in order to reap the glory for another flag. On the other hand Wilkes was too ready to report land without proving its existence, and Scott's track in 1904 to the south of all the land on Wilkes's chart east of the meridian of 155° E. somewhat reduces the length of coast-line claimed by the American expedition. We cannot mark on the chart the earlier cruise of Tapsell in the *Brisk*, but that would seem to restrict the coast seen by the American ships to land west of 143° E.

Wilkes was deserving of the greatest sympathy. His

248 SIEGE OF THE SOUTH POLE

expedition was involved in trouble before ever it set out, trouble of every kind dogged its track in tropical, temperate and polar waters and the troubles did not end when the storm-tossed ships came home on June 10, 1842. The gold medal of the Royal Geographical Society, the highest distinction in the geographical world, was conferred upon Wilkes a few years later, sufficient evidence of the esteem in which his geographical results were held in Europe. It cannot be said that his own countrymen received him with gratitude or unqualified approval, for shortly after his return he was brought before a court-martial on the distinct and separate charges preferred by his own officers of oppression, injustice to his men, illegal and severe punishment of savages, falsehood and scandalous conduct, the last charge including such mildly "scandalous" acts as wearing the uniform of a captain while still technically a lieutenant! The trial lasted six weeks, and reference has already been made to the charge of falsely stating that land had been discovered on January 19, 1840, the only one in any way affecting the Antarctic cruise. The result of the trial was acquittal, and Wilkes rose to a very high place in the United States Navy. He was a fine fighting officer and did good service for the North in the Civil War. One of his notable exploits brought the United Kingdom and the United States nearer war than they have ever been since 1815. This was the stoppage of the British mail-steamer Trent on the high seas on November 8, 1861, and the arrest of two envoys from the Confederate States who were proceeding to Europe. He retired on account of age in 1864, and was appointed Rear-Admiral in 1866; he lived until February, 1877, when he died in Washington in his eightieth year.

CHAPTER XII

JAMES CLARK ROSS

"With the tumultuous past the teeming future,
Glorious with visions of a full success."

—ROBERT BROWNING.

THE British Antarctic Expedition, fitted out by the Admiralty in accordance with the plan submitted by the British Association and approved by the Royal Society, was designed for its commander, whose personal qualities and exceptional experience made him the one man possible for the work. It would be interesting to give details of the earlier life and training of James Clark Ross, but unfortunately the data for such a memoir are very scanty.

The Ross family possessed the property of Balsarroch, in the parish of Kilmalcolm, Wigtownshire, at least as early as the beginning of the eighteenth century, and in 1761 the property came into the possession of the Rev. Andrew Ross, minister of the parish of Inch, who left four sons. The eldest of these was General Andrew Ross, who apparently predeceased his father, for the second son, George Ross, merchant in London, succeeded to the estate in 1792. The fourth son was Admiral Sir John Ross, famous as an Arctic explorer, who was born in 1777, and after a life of strenuous effort, died in 1856. George Ross left three sons, the eldest, Colonel Alexander Ross, who succeeded to the estate in 1800, while the youngest was James Clark Ross, the hero of the South Polar expedition. He was born in London on April 15th, 1800,

250 SIEGE OF THE SOUTH POLE

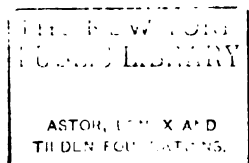
and as we have seen came of a family of soldiers and sailors. At the age of twelve he entered the navy, being placed under the care of his uncle, in whose ships he sailed until 1818. In 1819 he served on board H. M. S. Hecla under Sir Edward Parry, and continued for eight years with that great Arctic officer, taking part in several expeditions to the northern seas including the famous attempt to reach the North Pole by travelling over the ice beyond Spitsbergen in 1827. On returning from this expedition he was promoted to the rank of Commander, and sailed again in 1829, with his uncle Sir John Ross in Sir Felix Booth's ship Victory. On this occasion the expedition spent four years in the Arctic regions and was almost given up as lost. In the course of it James Clark Ross did an immense amount of sledging work, and on June 1, 1831, he reached the North magnetic pole and had the pleasure of hoisting the British flag on that interesting spot. He was promoted to the rank of Captain in 1834, and was in command of H. M. S. Cove in Baffin Bay in 1836.

Ross, who was reputed to be the handsomest man in the navy, was an excellent officer with a rigid sense of duty. There is a curious note by one of the members of the expedition which proves the firmness of the commander's character and may be viewed as a compliment, though intended as a censure. "Notwithstanding my having some personal influence with Captain Ross"—so runs the complaint—"both of us having served together as youths under our mutual old commander and friend, Sir Edward Parry, I could not induce him to cancel any order he had once placed in the order-book, so strong were his prejudices, and as a sequence so difficult to reason with."



James Clark Ross.

(From a Water-colour in the possession of the
Royal Geographical Society.)



Another member of the expedition thought that the discipline on board the Erebus was lax compared with that on the Terror, and believed that Ross permitted too much familiarity between the officers and men. The two criticisms are not consistent, and stress need not be laid on either. Ross's old friend, Sir John Franklin considered him to be an ambitious man who tried to do everything himself, and was not ready to encourage any initiative on the part of his subordinates. Franklin, in the same letter which contains this opinion, bears the strongest testimony to Ross's kindness and generosity and to his high sense of honour. He had, perhaps, a tendency to underestimate the qualities of foreigners, but that is not unusual in the fighting services of all nations and is perhaps to some degree inseparable from the overmastering devotion which a naval officer ought to bear to his own flag.

It is enough for us to know, and of this there cannot be a shadow of doubt, that there was no other man, not only in the British navy but in the British Empire, probably in the whole world, who was so thoroughly fitted to take command of a great polar expedition. And the result proved the truth of the opinion of his contemporaries.

Having taken part in the magnetic survey of the British Isles with Sabine and Lloyd, Ross was familiar with the latest developments of the science of terrestrial magnetism and so was in a position to be the scientific as well as the executive chief of an expedition designed mainly for magnetic work. The expedition was purely naval, the scientific equipment was utterly inadequate and no scientific staff was carried, although the naval surgeons attached to the ships were selected on account of their

252 SIEGE OF THE SOUTH POLE

scientific tastes. At least one of the assistant surgeons entered the navy for the express purpose of taking advantage of the scientific opportunities afforded by this voyage.

The command of the expedition was conferred on Captain Ross on April 8th, 1839, when he was appointed to H. M. S. Erebus, while his old shipmate, Commander Francis Rawdon Moira Crozier, was a month later appointed to command H. M. S. Terror, the second ship set apart for the expedition. Suggestions had been made as to the desirability of employing steamers for polar exploration; but steam power was still new in the navy and not to be thought of for an expedition to such distant waters. The Erebus was, in naval parlance, a "bomb," that is, a vessel specially made for carrying mortars designed to throw bombs of large diameter at a high angle of elevation. She was consequently very strongly built, entirely of wood, as were all sailing ships of that date and for long afterwards, and possessed of a capacious hold well adapted for the stowage of stores. She was a small vessel, only 370 tons burden, with clumsy rounded bows and a slow sailer excelling only in her power of rolling, but she had the compensating advantage of light draught of water, and a small crew was sufficient to work her.

The second vessel, the Terror, of 340 tons, was practically of the same size and build and she had already proved herself capable of contending with polar ice. In 1837 she had been strengthened for the purpose and dispatched to the relief of the whaling fleet which had been frozen up in Baffin Bay the previous winter. Under Sir George Back she had made a vain attempt to reach Repulse Bay, sustaining some damage in the effort.

All repairs had already been effected, and in a very short time both the *Erebus* and the *Terror* left the hands of the dockyard workmen as strong as ships could be made after the experience of generations of northern whalers and explorers. The decks were made of two thicknesses of the stoutest planking, separated by layers of water-proofed cloth, the bow and stern internally were filled up nearly solid with timbers, and externally all projections were removed and a thick outer skin of planking added, varying in thickness so as to present the greatest strength in those parts likely to come in contact with the floating ice. The hulls were double coppered, and copper was substituted for iron in the fastenings wherever it was possible to do so.

The ships were provisioned on the usual naval system, but a remarkable feature for that time was the large supply of fresh tinned meats and soups and the enormous quantity of vegetables—there being nearly five tons of carrots alone, and over four tons of pickles. Warm clothing of the best quality procurable was supplied for gratuitous issue to the crews, who were all volunteers and in receipt of double pay from the time of sailing. The officers were selected by Ross from a large number who applied for permission to take part in what was from the first a popular expedition. Each ship carried in addition to the captain, three lieutenants, a master, surgeon, purser, three mates, assistant surgeon, and second master, together with a crew of 64 men. The surgeon of each ship was specially charged with observations in zoölogy and geology; they were Mr. Robert McCormick on the *Erebus*, who had already had much experience in the Arctic regions, and Mr. John Robertson, on the *Terror*. The assistant surgeons were

254 SIEGE OF THE SOUTH POLE

in like manner charged with botanical observations, and for this work the Erebus was singularly fortunate in having Dr. Joseph Dalton Hooker, son of Sir W. J. Hooker, the eminent botanist. The youngest officer on the expedition (he was only 21), Sir Joseph Hooker has outlived all his shipmates and risen to the first rank amongst British men of science, always cherishing the memory of those years of unprecedented interest passed on the great voyage of discovery and largely instrumental sixty years later in securing the renewal of Antarctic research. The assistant surgeon on the Terror was Mr. David Lyall, and the second master of that ship, Mr. John E. Davis, was a skilled draughtsman who prepared the charts of the expedition, took advantage of every opportunity presented to him, and in his letters home gave a very vivid account of the incidents of the cruise.

Sir John Franklin, whose ability to judge of the qualities of polar explorers is not likely to be challenged, did not think much of the subordinate officers of the expedition when he met them in Tasmania—"there was scarcely one, with the exception of Hooker, above the ordinary run of the service," he said, in a confidential letter when comparing them with those whom he had selected to accompany him on his last and fatal voyage. This of course did not refer to Captain Crozier, whom Franklin subsequently selected as his own second in command, and Davis also might justly have been excepted.

The worst risk which the commander of a government expedition of exploration runs is to be hampered by the minuteness of his instructions which he dares not disobey even when unforeseen circumstances turn them into a prohibition of all progress. Ross was fortunate in com-



Sir Joseph Dalton Hooker, G.C.S.I.
(From a Pen and Ink Sketch by T. B. Wirgmann.)

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manding the confidence of the Admiralty to such a degree that his orders were qualified by a general discretion which left him wide freedom of action. The instructions given on September 16th, 1839, defined the purpose, order and duration of the cruise. It is of interest to compare them with the instructions given to the commanders of the other expeditions, and we accordingly quote their principal clauses:

“Whereas, it has been represented to us that the science of magnetism may be essentially improved by an extensive series of observations made in high southern latitudes, and by a comparison of such observations with others made at certain fixed stations, and whereas practical navigation must eventually derive important benefit from every improvement in that science, we have, in consideration of these objects, caused Her Majesty’s ships Erebus and Terror to be in all respects prepared for a voyage for carrying into complete execution the purposes above mentioned; and from the experience we have had of your abilities, zeal, and good conduct, we have thought fit to entrust you with the command of the expedition, and to direct Commander Crozier, whom we have appointed to Her Majesty’s ship Terror, to follow your orders for his proceedings.

“You are therefore required and directed, as soon as both vessels shall be in all respects ready, to put to sea with them, and on your way to your ulterior destination, you will touch at the Island of Madeira, in order to obtain the sea-rates of the several chronometers with which each vessel has been supplied. From thence (but making a short series of observations at the Rock of St. Paul) you will make the best of your way to the Island of St. Helena, where you are to land the observers and

256 SIEGE OF THE SOUTH POLE

the instruments for the fixed magnetic observatory intended for that station. . . .

“At the Cape of Good Hope the instruments and observers for the second fixed magnetic observatory are to be carefully landed; and having completed your water, and replaced the stores which you have expended, you are to proceed to the eastward, touching at Marion and Crozet Isles for observations, if the weather and other circumstances should be favourable for that purpose.

“As we have provided the expedition with invariable pendulums, and all the necessary apparatus for determining the figure of the earth; and as it is desirable that these observations should be made at several points, more especially in high southern latitudes, it is probable that Kerguelen Island will be found well suited to that purpose, as well as to an extensive series of magnetic and other observations; but the selection of these stations is freely confided to your judgment.

“If the operations at Kerguelen Island, or at such other places as you may select, should be completed before the end of February, 1840, you will possibly find the sea sufficiently open to proceed directly to the southward, to examine those places where indications of land have been noticed, and to make the requisite observations on any out-lying islands that you may be able to discover; but, at that advanced period of the season, you are cautiously to avoid being beset in the ice, as your early arrival at Van Diemen's Land is of far greater importance to the great object of the expedition than any results you could hope there to obtain. . . .

“At Van Diemen's Land you are to communicate with Lieutenant-Governor Sir John Franklin, who will have been instructed to prepare instruments for the third mag-

netic observatory, which you are to establish in the most advantageous position, and to place in charge of an officer. . . . Having brought this observatory into active operation, you will lose no time in proceeding to Sydney, which, according to the views contained in the before-mentioned report, will be a station eminently fitted for the determination of all the magnetic elements, and which will hereafter be the centre of reference for every species of local determination.

“The remaining winter months may be advantageously employed in visiting New Zealand and the adjacent islands. . . . but taking care to return to Van Diemen’s Land by the end of October, to refit Her Majesty’s ships, and to prepare them for a voyage to the southward.

“In the following summer, your provisions having been completed and your crews refreshed, you will proceed direct to the southward in order to determine the position of the magnetic pole, and even to attain to it if possible, which it is hoped will be one of the remarkable and creditable results of this expedition. In the execution, however, of this arduous part of the service entrusted to your enterprise and to your resources, you are to use your best endeavours to withdraw from the high latitudes in time to prevent the ships from being beset with the ice: . . . Should the expedition have been able to avoid wintering in a high latitude, you will return to Van Diemen’s Land, availing yourself of every opportunity you can seize of pursuing there, or in such other places as your deliberate judgment may prefer, those series of observations and experiments best adapted to carrying out the leading objects of the expedition.

“On the breaking up of the succeeding winter, you will resume the examination of the Antarctic seas in the

258 SIEGE OF THE SOUTH POLE

highest latitude you can reach, and proceeding to the eastward from the point at which you had left off the preceding year, you will seek for fresh places on which to plant your observatory in all directions from the pole.

“ In the event of finding any great extent of land, you will, as far as may be practicable, lay down the prominent parts of its coast line; and you will endeavour not only to correct the positions of Graham Land and Enderby Land, and other places which have been seen only at a distance, but to obtain some knowledge of the nature of those yet unvisited tracts for geographical research; and the magnetic objects of your voyage may be so conducted as mutually to assist each other. . . .

“ The South Shetlands, or the Orkneys, or perhaps the Sandwich Islands, and lastly, the Falklands, will probably terminate your magnetic labours in the Antarctic seas; and if at those latter islands you should not receive further orders from us, you will return to England by such a route as you may think most conducive to the ruling object of the expedition.

“ In an enterprise of the nature which has been briefly stated in these orders, much must be left to the discretion, temper, and judgment of the commanding officer; and we fully confide in your combined energy and prudence for the successful issue of a voyage, which will engross the attention of the scientific men of all Europe. . . . We also caution you against allowing the two vessels to separate; and we direct you to appoint, not only a sufficient number of well-chosen rendezvous, but to keep up the most unreserved communication with the commander of the *Terror*, placing in him every proper confidence. . . . We also recommend that a frequent

change should take place of the observations made in the two ships, in order that any scientific discovery made by the one, should be quickly communicated to the other, as well for their advantage and guidance in making their future observations, as for the purpose of more certainly ensuring their preservation. . . . In the event of any fatal accident to yourself, Commander Crozier is hereby authorised to take command of the expedition, either on board the Erebus or Terror, as he may prefer (placing the senior lieutenant in command of the other ship), to carry these instructions into execution.

“ In the event of England being involved in hostilities with any other power during your absence, you are clearly to understand that you are not to commit any hostile act whatever ; the expedition under your command being fitted out for the sole purpose of scientific discoveries and it being the established practice of all civilised nations to consider vessels so employed as exempt from the operations of war. . . . On your arrival in England, you are forthwith to repair to this office in order to lay before us a full account of your proceedings, taking care before you leave the ship to demand from the officers and all other persons on board, the logs and journals they had kept, and the charts, drawings, and observations which they had made, and which are all to be sealed up ; and you will issue similar directions to Commander Crozier and his officers, etc. ; the said logs, journals, and other documents to be thereafter disposed of as we may think proper to determine. You will also receive our future directions for the disposal of all such specimens of the animal, vegetable, and mineral kingdoms as in the course of the voyage may have been collected by any person on board of either of

260 SIEGE OF THE SOUTH POLE

the ships, and which you are to endeavour to preserve, as far as may be done without inconvenience."

In addition to the Admiralty instructions, the Royal Society prepared, through a series of committees, instructions for scientific observations to be made on terrestrial magnetism, geodesy, tides, meteorology, oceanic depths and temperature, astronomical phenomena, geology, zoölogy, and botany, the whole forming a volume of a hundred pages. It must be borne in mind that all that was enjoined was the collection of observations and of specimens to be dealt with at home after the return of the expedition; and that the various sciences were still in such an unspecialised state in 1839 that the acute observations of intelligent amateurs in the leisure afforded them by their official duties were capable of yielding results of very great value. This has long ceased to be the case, and the absence of a staff of trained scientific specialists from an expedition of exploration would now be as gross an absurdity as the absence of a skilled engineer, or electrician, or torpedo officer, from a ship of war on active service. In 1839, life in the navy and in the laboratory was a simpler affair than it now is, and it was as possible then for a naval officer of scientific tastes to conduct a scientific expedition with all the completeness desirable as it is now for a scientific man with a taste for the sea to navigate his own yacht. The surgeons, it must also be remembered, were men of scientific training, and amongst them there was one who speedily showed himself worthy to rank with Charles Darwin, who had recently completed his circumnavigation on H. M. S. Beagle, and with T. H. Huxley who, a few years later, pursued his researches off the Australian coast in the cramped quarters of H. M. S. Rattlesnake.

Still it cannot be denied that had the expedition of the *Erebus* and *Terror* been organised on the lines subsequently followed on that of the *Challenger* the gain to science would have been enormous.

As the *Erebus* and *Terror* lay in the Medway ready to start on their momentous expedition the little Eliza Scott entered the Thames returning from her daring voyage in the seas to which the expedition was bound, and Ross was made aware of the discovery of the Balleny Islands, which were hailed as a possible station for magnetic and pendulum work in the most interesting region.

One may assume that Smith, the discoverer of the South Shetlands, was acquainted with Weddell, who knew Morrell, who was a friend of Palmer, who met Bellingshausen in the most romantic way, and Weddell also met Biscoe, who, in turn, knew Wilkes, D'Urville and Balleny, while Balleny returned in time to see Ross, and Ross's assistant surgeon, Sir Joseph Hooker, was acquainted personally with the leaders of the Antarctic expeditions of the remainder of the nineteenth, and of the twentieth century.

It might be possible to find some link connecting Smith and Cook could one but penetrate the mist enveloping the history of the seal-trade of South Georgia, which began on Cook's return and was not quite extinct forty years later when the record of the nineteenth century discoveries opened. The chain was indeed completed through Bellingshausen's call for Sir Joseph Banks, the shipmate and constant friend of Cook; and thus by the joined hands of Russian, American and British explorers the great navigator was brought into living touch with Scott, Drygalski, Nordenskjöld and Bruce.

CHAPTER XIII

THE DISCOVERY OF VICTORIA LAND

"The fair breeze blew, the good ship flew
The furrow followed free.
We were the first who ever burst
Into that silent sea."

—COLERIDGE.

IF dark and lurid names could cast a gloom on the prospects of an expedition little harmony or satisfaction could have been expected when, on September 25th, 1839, the steamer *Hecate* towed the *Erebus*, followed by the *Terror*, into Margate Roads to await a favourable wind. In this case, however, there was nothing in names, and when the wind came away from the east on September 30th the *Erebus* and *Terror* set sail and beating round the Foreland dropped their pilots and made their way down Channel bound for the south magnetic pole. The ships were separated in a gale on October 3rd, and the *Erebus* proceeded alone, losing sight of the *Lizard* on the 5th, rejoicing to meet the open sea, all the worry of preparation safely over and Ross himself finding it "not easy to describe the joy and light-heartedness" of being fairly embarked on the enterprise he had so long desired to undertake. Scientific observations were at once reduced to a system, and even in the Bay of Biscay attempts at deep-sea soundings with from 300 to 600 fathoms of line were made. Madeira was reached on October 20th and the *Terror* arrived four days later. A barometric estimate of the height of Pico Ruivo was

made and the cairn erected by Wilkes's officers the year before was pointed out by the guides. On the 31st the appearance of bad weather caused the ships to depart from the open roadstead of Funchal earlier than was intended, and make for Tenerife.

On November 13th, the expedition reached the Cape Verde Islands; a week was spent in magnetic observations while the ships' stores of fresh provisions were being replenished. Thence they went to St. Paul's Rocks and South Trinidad, landings being made on both these isolated rocks. The equator had been crossed on December 3rd, all due ceremonies being performed on those who had never before entered the southern hemisphere, and four days later a much more interesting line was crossed. This was the magnetic equator, or line of no dip, where the freely suspended magnetic needle rested perfectly horizontal. Ross had made the excellent rule that the result of any important observation made on one ship should immediately be signalled to the other, and on this occasion he was greatly gratified by the signal of "no magnetic dip" being hoisted at the same moment by both vessels, proving that instruments and observers were alike in thorough working order.

The average naval officer understands something of physical observations, but the collection of geological and natural history specimens is a mystery to him, and he abhors such mysteries, as Mr. McCormick had already occasion to find in his efforts to induce the first lieutenant, to whom "everything connected with science is a bore and an enigma" to provide a place for his ever growing collection. No doubt the lieutenant sheltered himself under the happy saving clause of the Admiralty Instructions "without inconvenience." The more im-

264 SIEGE OF THE SOUTH POLE

portant problem of deep-sea sounding was approaching a successful solution though it did not reach it on this voyage. Ross had a sounding-line 3600 fathoms in length prepared on board, strong enough to stand a lead weighing 76 pounds, and fitted with swivels to prevent the strands untwisting in the water. With this he got a sounding in 2425 fathoms on January 3rd, though the line parted in heaving in.

On January 31st, 1840, the two ships anchored in St. Helena Roads, having had a hard time of it beating up to the island against the trade-wind. Steps were immediately taken to select a site for the magnetic observatory, and Lieutenant Lefroy, the young artillery officer who was sent out to take charge of it, landed with his assistants. The ships sailed again on February 9th and made their way leisurely to the Cape of Good Hope, occasionally stopping to sound when the sea was calm and boats could be used, and always making magnetic observations for the purpose of determining the line of least intensity, to the exact position of which Sabine attached much importance. On March 17th anchor was cast in Simon's Bay and the magnetic instruments were at once landed in order to secure comparisons that would enable the Antarctic observations to be properly interpreted. The fixed observatory was set up close to the Astronomical Observatory and Lieutenant Eardley Wilmot of the Royal Artillery with three assistants who had come out with the Erebus were landed to take charge of it.

Light baffling winds made it a difficult matter to get away from Simon's Bay when the ships set out on April 6th, 1840, but at night a succession of violent squalls with thunder and lightning separated the two vessels and

the Erebus pursued her solitary way to Prince Edward Islands, where it was hoped a landing could be made. Marion Island, one of this group, was reached on the 21st, but the weather was threatening; it was impossible to land and the Erebus continued her course to the Crozets running before a heavy westerly gale. The Crozets were reached on the 26th, but the ship ran past Possession Island, her rendezvous with the Terror and the quarters of a sealing party to which Ross had promised a Cape Town merchant to convey some stores; so that nearly a week was spent beating up against the westerly winds of the "roaring forties" and standing off and on during gales in order to recover the ground lost in a few hours. At length on May 1st it was possible to communicate with the shore and the sealers were found looking more like Eskimos than civilised beings, but far filthier than any members of that Arctic race that Ross had ever seen. They had been eighteen months on the island and were expecting a ship to bring them home instead of the orders which now reached them to stay on for an indefinite time. No landing was made from the Erebus and she held on her course for Kerguelen Land, where she met the Terror in Christmas Harbour on May 14th.

A magnetic and an astronomical observatory were fitted up on shore at the head of Christmas Harbour and the systematic observations made on May 29th and 30th, two of the days set apart for simultaneous observations at all the European and British stations, proved of exceptional interest. They happened to be days of great magnetic disturbance and it was subsequently proved that every movement of the needle at Kerguelen was simultaneous with a similar movement of the needle

266 SIEGE OF THE SOUTH POLE

in Toronto almost at its antipodes. The ships remained at their anchorage for more than two months; furious gales were experienced on forty-five days in that time, and there were only two days on which neither rain nor snow fell, but the magnetic observations were kept up hourly day and night without a break. An opportunity was afforded for the ships' companies to become acquainted with penguins as an article of diet, and Ross, who resembled his great predecessor Cook in his power of digesting strange food, experimented on other sea birds also.

The observatories were taken down, and on July 20th, 1840, the Erebus and Terror left Christmas Harbour. The weather was exceedingly tempestuous, the boatswain of the Erebus was blown from the rigging and drowned, four men of the party who attempted to rescue him nearly sharing the same fate, and the two ships were soon separated not to meet again until they arrived at Hobart Town on August 16th.

Sir John Franklin, the Governor of Van Diemen's Land, was ready to receive the expedition and furthered its progress in every possible way. He had all the materials ready for building a magnetic observatory and the day after the Erebus arrived he assisted Captain Ross to select a site which received the appropriate name of Rossbank. By dint of hard work the observatory was finished and ready for work a few hours before the international simultaneous observations of August 27th had to be commenced. The interest which everyone in the colony took in the work of the expedition was curiously shown by the gang of convicts who had been engaged in roofing the observatory from 6 a. m. to 10 p. m. one Saturday, begging to be allowed to con-

tinue at work for a few hours more in order to finish the job, for which of course they could expect neither pay nor privilege. This request was refused as it would have involved encroaching on the early hours of Sunday.

During their stay at Hobart the officers of the expedition were received with the utmost hospitality by Sir John Franklin. The diary of Mr. McCormick shows that he dined every alternate Monday at Government House in order to take part in the meetings of the Tasmanian Natural History Society which were held there at the Governor's invitation. This Society developed into the Royal Society of Tasmania, and the earliest paper communicated to it was the description of a fossil tree by Hooker. Balls, concerts, picnics and entertainments of every kind were lavished on the members of the expedition, who enjoyed to the full their last glimpse of civilisation before plunging into the unknown world of ice. Franklin assisted personally in the magnetic observations on the international term days, when it was necessary to enlist the aid of volunteers to carry on a double set of readings in the permanent and temporary observatories.

News was received at Hobart which weighed heavily on the mind of the leader of the expedition. Notices in the Australian newspapers acquainted him with the doings of Dumont D'Urville's ships in the previous year and the letter from Wilkes, to which reference has already been made, gave information as to the American discoveries in the very region to which the Erebus and Terror were bound in pursuance of the Admiralty instructions. There is no doubt that Ross was very angry at being forestalled, though as we have seen Wilkes's

268 SIEGE OF THE SOUTH POLE

instructions, dated a year before his own, left that officer no choice but to proceed on the course he followed, and in any case the high seas are free to all to sail where they will or can.

Ross however interpreted his instructions in the light of the large discretion that had been left to him. His reasoning was that of a sailor rather than a man of science, based on patriotic rather than scientific considerations and revealing incidentally that, specialist as he was, his mind ran no less on geographical discovery than on terrestrial magnetism. Fortunately in this case the reasoning led right. He says:

"Impressed with the feeling that England had ever *led* the way of discovery in the southern as well as in the northern regions, I considered it would have been inconsistent with the preëminence she has ever maintained if we were to follow in the footsteps of the expedition of any other nation. I therefore resolved at once to avoid all interference with their discoveries and selected a much more easterly meridian (170° E.), on which to endeavour to penetrate to the southward, and if possible reach the magnetic pole."

The reason he selected this meridian was that on it Balleny two years before had found an open sea in 69° S.

The new plans once adopted and the magnetic observations at Hobart being placed under the charge of Lieutenant Kay and two mates, preparations were made for the expedition to put to sea. Stores had been completed, officers and men were in the best of health and the highest of spirits, looking forward eagerly to the adventures that lay before them. On November 12th, 1840, Sir John Franklin came on board the Erebus at

7.30 a. m. and accompanied the ships to the mouth of the river, leaving at 1.30, when the crews manned the rigging and saluted the Arctic hero with three cheers as they passed out on their own great voyage. How gladly Franklin would have left the troubles of his uncongenial governorship to face the lighter difficulties of navigating an unknown and ice encumbered sea was probably not suspected by his friends; nor could he or they foresee the tragic bond that was to associate him with the ships which were now bound south. The Auckland Islands were reached on the 20th and a landing made to set up the magnetic observatory in readiness for the next international term day. Two conspicuous notices were found recording the call of the *Astrolabe*, *Zélée* and *Porpoise* in March of the same year on their return from their voyages along the Antarctic circle.

Sail was made again on December 12th and next day Campbell Island was reached and in getting the ships into Perseverance harbour there, both of them went aground, but were soon got afloat again without damage, the *Erebus* being warped off by hawsers made fast to the trees on shore; the *Terror* floated off by the rising tide. Both here and at the Auckland Islands Dr. Hooker made large botanical collections, working up the flora of the islands to a surprising extent considering the very short time at his disposal and the rough nature of the country away from the shore.

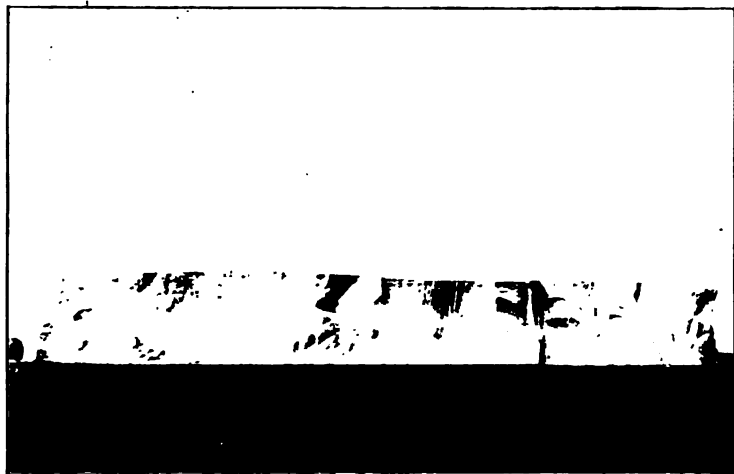
Ross now decided to proceed to the southward on the meridian of Campbell Island (169° E.), instead of going on to the meridian of Hobart.

Campbell Island was left behind on December 17th, and joy and satisfaction beamed on every face as the crews knew that nothing now lay between them and their

goal. The increasing number of petrels of various species, the penguins which began to appear and the albatrosses sweeping round the ships raised hopes of the proximity of land. The weather was not too favourable, midsummer as it was. The Christmas dinner was eaten while laying-to in a gale of wind, Captain Ross—who, following the custom of the navy, messed alone—was on this occasion the guest of the officers in the gun-room. Two days later the first iceberg was seen in $63^{\circ} 20' \text{ S.}$, and before night fifteen were in sight. A great many whales were seen, so tame that they allowed the ships to pass quite close to them. They were "the common black kind, greatly resembling, but said to be distinct from the Greenland whale," and any number of them might have been killed.

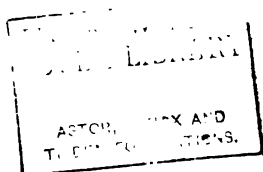
On the 30th the ships crossed Bellingshausen's track in $64^{\circ} 38' \text{ S.}$, $173^{\circ} 10' \text{ E.}$, and as it fell calm in the afternoon a sounding was taken with 5000 fathoms of line on the reel, and bottom was struck at 1560 fathoms. Temperature observations were made; but as the special thermometers designed to withstand the pressure of the water which had been ordered to reach the expedition at Hobart Town had not been received, the results were of no value. This day the beautiful snow-petrel appeared, its body of spotless white with jet black beak and legs, a premonition of the approach of ice, for it was soon discovered that the bird never strays far from the main pack.

At 9 a. m. on the last day of the year a long line of ice appeared on the horizon which soon proved to be the edge of the pack. The weather fell calm and the two ships lay in front of the low line of ice unable to approach or to retire from it. Other Antarctic ex-



Iceberg in Ross Sea.

**(From a Photograph taken by the National Antarctic Expedition
on Board the Discovery.)**



plorers in a like position would have whistled for a wind to carry them out of the reach of the ice, but not those on board the *Erebus* and *Terror*. Never before had the Antarctic circle been approached by ships for which the ice-pack had no terrors. Cook had to retire before the pack-edge in his strong north-country colliers, the sealers in their little craft, the circumnavigators of Russia, France and America dared not venture within it for their ships would have been crushed like egg-shells in the grinding ice. To all his predecessors therefore the edge of the pack was as effectual a barrier as the glacier fronts that girdle the Antarctic land, but to Ross it was only an encumbered path. Early on the morning of New Year's Day, 1841, a breeze rose and the ships moved up towards the pack and the same afternoon crossed the Antarctic circle. There was a heavy swell and too little wind to give the vessels steerage way amongst the ice, so they held off, while the crews were entertained by the issue of extra rations and the presentation to each man of the special warm clothing provided for the polar seas, including the quaint form of head-covering known as a Welsh wig. An iceberg was seen next morning much discoloured with earthy matter and carrying a large block of stone, specimens of which were taken. This first evidence of Antarctic land proved to be a rock of volcanic origin. A fresh breeze sprang up, but with it came fog and snow-showers and Ross stood to the northward not anxious to commence navigation in the ice in unfavourable conditions. The setting sun took $17\frac{1}{2}$ minutes to sink from sight as it skimmed along the southern horizon and commenced to rise again immediately afterwards.

The pack was at length entered on the morning of

272 SIEGE OF THE SOUTH POLE

January 5th. No ships had ever before been able to make so determined an attack on the secret of the south pole. After about an hour's hard thumping from the heavy ice of the pack edge the ships forced their way into a series of open holes connected by lanes of water. Most of the ice was of one year's growth, but here and there were hummocky masses formed by pressure in much older ice, the whole however was far less formidable than the reports of earlier explorers had led Ross to expect. By noon in latitude $66^{\circ} 55'$ S. and longitude $174^{\circ} 34'$ E. it was no longer possible to make out the open sea from the mast-head, nothing but ice could be seen on every side. The leads which opened before them enabled the ships to pick their way southward without great difficulty though collisions with the ice occasionally occurred so violent as to have been fatal to any ships less strongly fortified. A remarkable appearance of land was reported, the illusion being so perfect that many on board would not believe that it was merely a cloud of a firm and mountain-like outline until the ships had actually passed over the position it had appeared to occupy. Flocks of penguins followed the ship, attracted by the sailors' imitation of their own cries, and though the birds floundered more slowly over the ice than the ships could sail along it, they soon caught up when they took to the water, playing round the vessels like porpoises. The dark sky indicative of open water now appeared in the southeast, but the pack grew closer and progress was very slow, the whole pack drifting steadily to the northward. By taking advantage of every opportunity of progress, at 5 a. m. on January 9th the ships ran out of the pack into the open sea to the south, reaching $69^{\circ} 15'$ S. in $176^{\circ} 15'$ E. at noon. An easterly gale sprang

up and when it moderated next day not a particle of ice was to be seen, nothing appeared but open sea.

It was an epoch in the history of discovery: the magic wall from before which every previous explorer had to turn back in despair, had fallen into fragments at the first determined effort to break through it. The opportunity opening before the triumphant ships was one of those that occur but once or twice in the course of the ages—the first seafarer to pass the Pillars of Hercules, Diaz when he doubled the Cape of Storms, Columbus when he sighted the West Indies, Balboa when he first saw the Pacific “silent upon a peak in Darien,” Magellan when he forced his way through his strait into the trackless ocean had experienced similar moments. It was impossible to predict how much might lie beyond that unbroken expanse of clear sea. The expedition seemed to be a success at its very start. The course was set for the south, straight for the magnetic pole which the increasing dip of the needle, now 85° , showed could not be very far away. Just as hopes of reaching the magnetic pole were at their height came the report of land ahead, a discovery that was actually a disappointment, coming as it did in the form of an obstacle to the immediate attainment of the principal object of the expedition.

The land was first seen at a distance of fully one hundred miles, its lofty peaks rose higher and higher as the ships steered straight for the culminating summit, to which Ross gave the name of Mount Sabine after “the first proposer and one of the most active and zealous promoters of the expedition.” At 6 p. m. on January 11th the land was only a few miles distant, but the wind was blowing on-shore and the surf was beating

274 SIEGE OF THE SOUTH POLE

upon a line of heavy pack-ice, making a landing impossible. A notable promontory of the new coastline opposite the position of the ships was named Cape Adare after Viscount Adare, M.P., who had been one of the warm supporters of the expedition. It stood up in high dark cliffs of apparently volcanic rock in strong contrast to the snow-covered heights behind and the white ice-pack in front. Two great ranges of mountains were now plainly to be seen, for the evening was perfectly clear and the snowy summits stood out sharply against the sky, their heights ranging from 7000 to 10,000 feet above sea level. Here and there black rocks broke through the covering of snow, here and there from the valleys great glaciers projected for several miles into the sea and terminated in perpendicular cliffs of solid ice.

The range of mountains running to the northwest from behind Cape Adare Ross called the Admiralty Range and on each peak he enthroned the name of one of the Lords of the Admiralty under whose orders he was serving. This happy Board of Admiralty which looks out forever over Ross Sea consisted as the map will always remind us, of Earl Minto, First Lord, Admiral Sir Charles Adam and Admiral Sir William Parker, the two senior Naval Lords, Admiral Sir Edward Troubridge, Captain Sir Samuel Pechell and Lord Dalmeny, the Junior Lords. Few indeed would now remember these names had they not been so commemorated. The ships were full of jubilation that for the first time since Bellingshausen's voyage the most southerly known land of the globe was once more a British discovery.

The magnetic observations indicated that the pole for which the expedition was bound lay about 500 miles to



Admiralty Range.

(From a Photograph taken by the National Antarctic Expedition.)

FRIDAY, NOV. 17, 1900
PUBLIC LIBRARY

ASTOR, LENOX AND
TILDEN FOUNDATIONS.

the southwest, straight across the land. It was necessary to decide whether the effort to turn the edge of the land was to be made by following it northwestward or southward from Cape Adare (71° S.). The latter course was adopted as it would be sure at least to lead into higher latitudes. During the night the ships got within two or three miles of a group of small islands close inshore, and on the morning of January 12th, 1841, Ross and Crozier, leaving the ships in the charge of the first lieutenants, got into their boats and pulled toward the shore to try to land. The coast of the mainland was quite inaccessible on account of the continuous belt of ice projecting into the sea beaten upon by heavy surf. A strong tide carrying with it floating masses of ice ran between the ice-bound mainland and the group of rocky islands so that the boats were almost unmanageable. They were fortunate however in getting into an eddy in the lee of the largest island and so were able to land on a beach of large loose stones and lumps of stranded ice. The weather had changed for the worse and was very threatening, the ships were flying signals to recall the boats so that the formalities had to be hastened. No time was lost in setting up a flagstaff, in hoisting the Union Jack as it had been hoisted on so many strange shores in distant seas, though never before on so strange and distant a land as this, and never in the presence of so unsavoury and clamorous a crowd of natives. Not human savages, but "little old gentlemen in evening dress," as D'Urville called the penguins, assisted in inconceivable myriads ranged along the ledges and packed close on the level places of the island, when the first formula in which the name of Queen Victoria was pronounced in taking possession of a new land was

276 SIEGE OF THE SOUTH POLE

followed by the cheers of the landing party. Possession Island was the name given, and its position is $71^{\circ} 56' \text{ S.}$, $171^{\circ} 7' \text{ E.}$ No trace of vegetation of any kind was found, and the penguins must have felt they had successfully repelled the invaders as amidst their hoarse cries the men got back into the boats, not a few bleeding from the attacks of the birds. The stench of the guano was overpowering and the boats' crews were glad to get safe on board just before a thick fog and strong north wind set in which, had they not pulled so lustily, would have made it impossible to regain the ships and necessary to return and spend the night among the penguins.

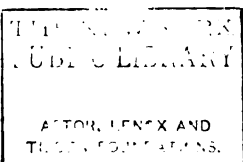
A heavy storm came on compelling the ships to stand out to sea, and the captains were relieved to find in the gale and blinding snow storms that the vessels tossed violently in a heavy sea, for that proved that they were not locked in by ice. The wind changed to the south and blew for two days with unabated force so that it was all the ships could do to keep their ground. On the 14th it was again quiet and clear and the ships stood in toward the new coast passing a great number of whales, amongst which Ross believed the spirited merchants of Great Britain would soon spread consternation, and tap for themselves and their country a new source of national and individual wealth. Next morning the chain of giant mountains running southward from Cape Adare formed a spectacle of the utmost grandeur and magnificence rising with sharply pointed summits to heights of from 12,000 to 14,000 feet, one sweep of spotless snow from sea to sky. To these summits Ross with happy instinct, gave the names of the leading members of the Royal Society and the British Association who



Possession Island.



Penguin Hunting.
(From Ross's "Voyage to the Southern Seas.")



had promoted the expedition, and so the names of the members of the various committees of advice stand in line with those of the contemporary Lords of the Admiralty.

As the ships beat to windward south along the coast they were still attended by flocks of penguins playing round them like porpoises. Constant soundings were taken and the depth was found to range between 60 and 92 fathoms at a distance of between two and four miles from the shore. The coast was keenly scanned for any harbour in which it would be possible to secure the ships and allow of observations on shore on the next international term-day which was now approaching; but every valley of the land appeared to end in a bay so full of glacier ice as to afford no shelter. The wind continued contrary and it was hard work to keep the position already gained, while the brief navigable season was slipping past with little prospect of getting farther south despite the open sea. On the 17th a new point of land appeared which Ross, true to the sailor's tradition, called Cape Anne after his fiancée whose birthday it happened to be, and as the land proved to be an island, it was named Coulman Island after the lady's father, while the north end was called Cape Wadworth in memory of her uncle's house Wadworth Hall, "a spot of many happy associations."

After this auspicious event the weather improved, a southwesterly wind enabled a course to be made to the south-southeast, away from the land but into an absolutely unexplored and ice-free sea. Tacking back toward land new mountains appeared to the southward and the founders and secretaries of the British Association were commemorated in their names.

278 SIEGE OF THE SOUTH POLE

Lying becalmed one day Ross had a dredge put over in 270 fathoms and was rewarded by a rich haul of rock-fragments dropped by the icebergs and a surprising profusion of animal life. One of the finds named *Idotea Baffini* from its occurrence in Baffin Bay had previously been considered peculiar to the Arctic Seas. It was the first form of life which appeared to flourish in both polar seas and to be absent from the whole ocean between.

At length a fair wind came, the ships made all sail for the south, every scrap of canvas was hoisted that could be rigged, and with studding-sails set on both sides the *Erebus* and *Terror* ran to the southward, officers and crews too excited to sleep and hardly leaving the deck in case they should miss the first sight of something new. Even after the fog and snow which were found to accompany north winds in those seas had set in, the ships held on their way, approaching the latitude of 74° S. on January 20th.

A mountain higher than any previously seen was sighted on the 21st and named Mt. Melbourne in honour of the Prime Minister, who had given so encouraging a reception to the promoters of the expedition. It was a mountain so strikingly similar in outline to Mount Etna that on both ships it went at first by that name. A field of close unbroken ice extended outward from the shore and it was hopeless to try to penetrate it, so the ships sailed on along its edge, but the winds and currents were baffling and it was scarcely possible to make progress. The night of Saturday, January 22nd, 1841, was exquisitely clear and beautiful, the sun at midnight skimmed along the southern horizon four times its own diameter above the sea-line. An extra allowance of grog

was served out to let the sailors rejoice that Weddell's farthest toward the south pole had been surpassed and they were now at last the pioneers of the human race in that direction. Captain Ross spent the evening in the gun-room with his officers and all drank the toast of "Better luck still." The ships continued along the edge of the pack that fringed the land to the eastward, the dip of the needle increased to 88° and the magnetic pole was now calculated to be less than 250 miles away.

On January 27th the latitude of $76^{\circ} 8' S.$ was reached and an island discovered which was called after Sir John Franklin. Here a landing was made with much difficulty and Dr. Hooker, whose turn it was to join the landing party, slipped into the water in jumping ashore and was in great danger of being crushed between the boat and the rocks. The ceremony of taking possession was hastened in consequence, and all in the party were thoroughly drenched by the spray before they got back to the ships. A large collection of rock specimens was secured, but the island showed no sign of vegetation and from the absence of any plant life from Possession Island also Ross somewhat rashly concluded that the vegetable kingdom had no representatives on the Antarctic lands.

It had been a memorable day and at midnight it merged into one of still more remarkable achievement. Several distant islands were logged by the Erebus, but they did not appear on the chart because a nearer approach made it evident that they were mountain summits on the mainland. As the light strengthened on January 28th the summit of the loftiest peak, which seemed to be veiled in driving snow drift was discovered

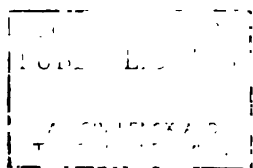
280 SIEGE OF THE SOUTH POLE

to be really emitting dense volumes of smoke. The ships approached nearer and the smoke was seen to be shot with flames or lit up by the dull glare of molten lava lying within the crater, while some on board even declared that they saw streams of red hot lava pouring down the snow. The land from which this mountain rose was provisionally called "High Island," and besides the huge volcano, towering to a height of 12,400 feet and appropriately named Mount Erebus after the leading ship, there was another summit but little lower (10,900 feet), which received the name of Mount Terror.

The discovery was of a thrilling nature. A "burning mountain" was the last phenomenon of Nature that was to be looked for amidst the eternal ice of the far south, though indeed the observation of Balleny on the islands that bear his name two years before might almost have prepared one for it. As the Erebus and Terror afloat approached the Erebus and Terror enthroned on High Island it was with the hope of passing that island and penetrating far beyond. Ross said that in imagination they were already south of the eightieth parallel and they had even appointed a rendezvous in that latitude in case the ships should get separated. But this was only a dream. In the clear sunshine a line of white cliffs was made out running east from High Island and when approached this was found to be a mighty wall of ice unlike anything that had ever been seen before by anyone on board. To penetrate this barrier was as impossible as to sail through the cliffs of Dover, all that could be done was to try to get round it. Curiously enough the opinion as to the nature of this most southerly land which was formed when it was first sighted was correct;



View of the Great Southern Barrier.
(From Ross's "Voyage to the Southern Seas.")



but on approaching nearer Ross convinced himself that High Island was no island, but part of the continent and he caught sight of high land over the wall of ice which he believed to be a great range of mountains running southward from Cape Crozier, the point where the rocks of the land and the ice of the barrier met. Years before Sir Edward Parry had given Ross's name to the most northerly known land on the globe, and with a due sense of the fitness of things, Ross gave the name of Parry Mountains to this most southerly chain. For sixty-three years this fine example of a grateful memory graced the map, though all that now remains is another warning that in the polar regions the sense of sight is apt to play sad tricks—for the Parry mountains do not exist, and Erebus and Terror after all are the peaks of an island separated from the mainland of Antarctica.

The dip and declination of the magnetic needle showed that the ships were now south as well as east of the position of the magnetic pole towards which the heavy land-ice made it impossible to approach by steering to the westward. The only thing that could be done was to follow the edge of the ice-barrier to the eastward in the hope that it would ultimately trend to the southward. The ships accordingly approached within three or four miles of the perpendicular ice cliffs, which rose smooth and solid to the height of from 200 to 300 feet and formed a straight line against the sky. Even from the masthead it was impossible to see over the wall, and all that could be ascertained regarding it was that it was flat-topped. The swell broke in a heavy surf upon the ice, and the sea was seen to have hollowed caves in the lower part of the ice-wall. Mount Erebus, towering

282 SIEGE OF THE SOUTH POLE

above the ships, suddenly broke into violent eruption, throwing out a column of smoke between 200 and 300 feet in diameter to a height of from 1500 to 2000 feet. The display commenced about 4 p. m. and continued in spasmodic spurts of smoke at intervals of about half an hour.

Not only the officers, but all the crews, were filled with admiration at the sights they saw, though the working of the ships left little time for contemplation. As the irrepressible Irish blacksmith of the Erebus put it, when writing a description of the first-seen land—"My friend if I could only view and study the Sublimity of Nature—but, lo, I had to pull the brails!" Nevertheless he had time to burst into song:

"Awful and sublime, magnificent and rare,
No other earthly object with the Barrier can compare!"

For five days the ships worked their way eastward, keeping the barrier in sight for the most part, but sometimes making detours to the north to escape the floating ice. Soundings were taken at frequent intervals and the depths found to vary between 250 and 500 fathoms. At places it would appear that the great Southern Barrier was resting on the bottom, but at other places it was undoubtedly afloat, and the huge flat-topped bergs which drifted northward with the current were obviously portions of the mass that had broken off. The size of the bergs may be realised from the remark of a sailor that the whole of London might float away on one of them. Experienced as Ross was in all the forms of Arctic ice the gigantic dimensions of the great Southern Barrier were as amazing to him as to anyone on board. When, on February 2nd, the ships got close up to the

barrier and reached the highest latitude for the trip, $78^{\circ} 4' \text{ S.}$, they had followed the icy wall, though sometimes at too great a distance to see it, for a continuous length of 250 miles. At that point it was 160 feet high, the cliffs of ice rising sheer from the water, and considering the depth, it must have been afloat so that the total thickness of this sheet of continental ice could not have been less than a thousand feet.

Nearly every day a bottle containing a note of the position of the ship was thrown overboard, in the hope that they might ultimately be picked up and throw some light on the currents of the Southern Ocean. But in those days the southern continents were but thinly peopled, and it is not altogether surprising that none of the messengers from the edge of the ice ever appeared again. The days were full of work and anxiety, for the cold was becoming severe, the pack-ice was sometimes so dense as to imprison the ships in a pond of water in which they had little room to manœuvre, and young ice was beginning to form. A bay was observed in the edge of the barrier in about 187° E. , and here the ice-wall, at one point, was only fifty feet high, and for the first time it was possible to catch a glimpse of the upper surface. The Erebus stood in to within a quarter of a mile of the ice-cliffs at 5.40 a. m. on the 9th, Ross stating that he could not permit himself to relinquish so favourable an opportunity of getting quite close to it. McCormick, however, who had spent the whole twenty-four hours of continuous daylight on deck, insinuates that the officer of the watch, instigated by himself, ran the ship in so close that the ice-cliffs took the wind from her sails as she tried to go about, and while she hung in stays the captain came on deck and rated the lieutenant in charge

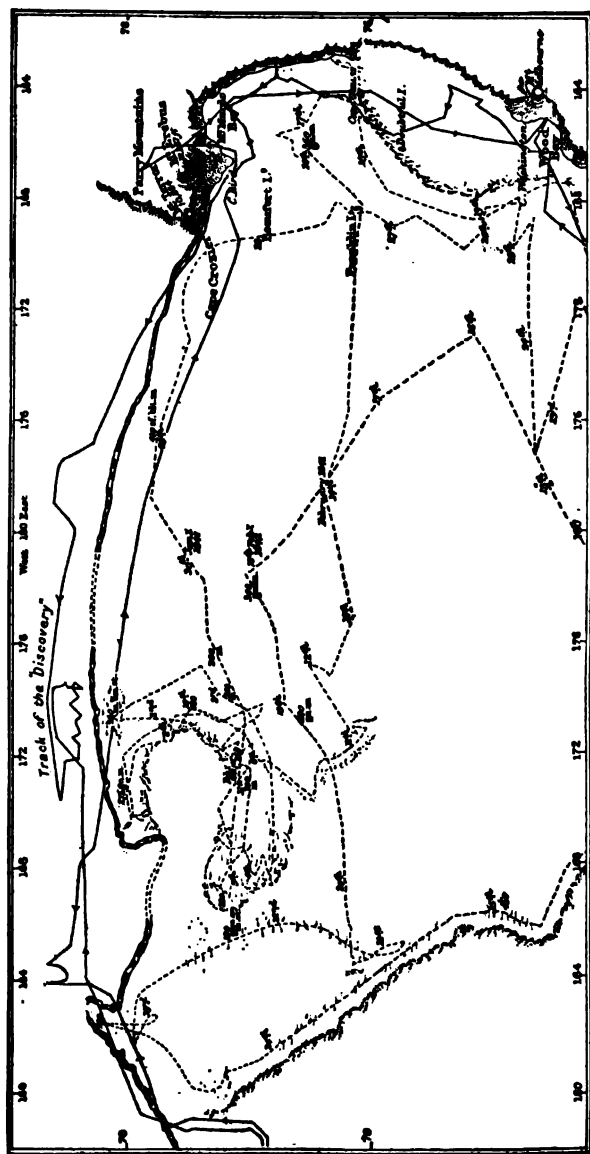
284 SIEGE OF THE SOUTH POLE

for venturing so near. McCormick's strictures on the captain, however, do not always bear critical examination.

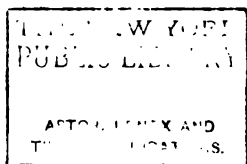
The farthest east reached had been 167° W., on February 5th, and, although the ships struggled for another week to explore the edge of the barrier farther in that direction, they did not get so far again and Ross was at length obliged very reluctantly to give up the attempt for the season. On February 14th, the expedition turned back toward the magnetic pole in order to seek a harbour in which they might lie safely for the winter. Franklin Island was sighted next day, for the wind had been favourable and the sea open. On the 16th, Mount Erebus was in sight in magnificent eruption, and it was then that the island on which it is situated appeared to form part of the continent. The deep bight to the southwest was named McMurdo Bay, but instead of examining it closely, Ross turned northwards in order to make one more attempt to land in the latitude of the magnetic pole. The pack lay thick along the coast of Victoria Land, and it was impossible to get nearer the shore than 15 or 16 miles, so after consultation with Crozier, Ross decided to give up the attempt, and as he could see no place in which it seemed practicable to winter he resolved to return to Hobart as speedily as possible.

This decision was not an agreeable one to arrive at. He says:

"It was, nevertheless, painfully vexatious to behold at an easily accessible distance under other circumstances the range of mountains in which the pole is placed, and to feel how nearly that chief object of our undertaking had been accomplished; and but few can understand the deep feelings of regret with which I felt myself com-



Ross's Chart of the great Southern Barrier with the track of the Discovery added.



pelled to abandon the perhaps too ambitious hope I had so long cherished of being permitted to plant the flag of my country on both the magnetic poles of our globe."

The very flag that had been raised at the North magnetic pole was, in fact, on board the *Erebus* ready for its second service if the fates had been kind. The range amongst which the magnetic pole was believed to lie was named the Albert Mountains, and the name of Victoria, which has since been given to a colony, to many towns, lakes, rivers, and mountains, was given first of all to "the whole of the great southern land we had discovered, and whose continuity we had traced from the seventieth to the seventy-ninth degree of latitude." The name was thus evidently intended to apply to the Antarctic continent, not merely to the stretch of coast which had been followed southward. One other name was bestowed before the land dropped from sight. This was Cape Washington, a headland to the south of Mt. Melbourne, called for the former secretary of the Royal Geographical Society, whose strenuous advocacy of the renewal of Antarctic research, although falling on deaf ears in the council of his society had, as we have seen, helped to stimulate, not only British, but also French interest in exploration to the south.

The season was rapidly advancing and the whole surface of the sea was curdling with young ice when Ross realised that there was no good place to winter in and that it was necessary to return northward. It was somewhat difficult to escape from this ice which was too strong for the ships to sail through with a light breeze, and at the same time not firm enough for men to work the ice-saws upon it. It was ultimately broken up by the

286 SIEGE OF THE SOUTH POLE

use of boats, the weight of which cracked the ice and opened a way for the ships to reach clear water.

On February 21st, the ships were once more off Cape Adare, and several days were spent searching along the ice-bound coast for a harbour in which it would be possible to winter, or at least for a place where a landing could be made, but neither could be seen, although the weather was clear and bright, affording fine views of the land which was finally lost sight of on February 28th. The approach of winter was now heralded by the lengthening nights which allowed the aurora australis to appear for the first time. Whales of great size were very numerous, and Ross believing them to be a valuable species looked on them as hopeful pioneers of exploration tempting the whaling fleets to visit those seas, but much more than half a century was destined to pass away before a whale-ship ventured within a thousand miles of them.

The ships were steering northwestward, and on March 2nd they sighted two lofty islands or mountains at a great distance. These were almost certainly part of the Balleny group, but they received new names on the occasion of their rediscovery—Russell Peak and Smyth Island. Two days later a third was sighted and named Francis Island. A strong appearance of land to the westward, high and broken into islands, was also made out before thick weather blotted out the distance. In the evening the Antarctic circle was crossed northwards after the expedition had spent the unprecedented time of sixty-three days continuously to the south of it. A good look-out was now kept for the mountainous land on Wilkes's chart, which Ross naturally supposed to represent one of the discoveries of the American expedition,

though Wilkes, as we have seen, subsequently explained it as a clumsy attempt to show the approximate position of Balleny Islands. One of the officers indeed reported an appearance of land bearing in the exact direction of the Balleny Islands, but these were seventy or eighty miles distant. Although Wilkes had claimed no personal discoveries so far to the east, the opinion prevailed on board the British ships that they had sailed over a part of the "Antarctic Continent" of the American exploring expedition. We have discussed the unpleasant episode of the controversy in sufficient detail in an earlier chapter.

It remained to traverse the belt of pack-ice which intervened between the comparatively open sea to the south along Victoria Land and the ocean. This was a task of danger and difficulty, but it was accomplished without damage, thanks to the skill born of long experience with which the ships were handled, and by March 20th the pack was cleared.

A point of interest in magnetic theory remained to be cleared up, and as his crews were in excellent health, Ross sailed along the pack to the westward in order to determine the magnetic dip on the line of no variation in longitude 135° E. This was done in a thorough manner and on some days when the wind fell calm the insatiable explorer had the boats out and took deep-sea soundings, one of them striking bottom in the depth very rarely measured in those days of 1540 fathoms.

On April 6th, 1841, Ross had the pride and satisfaction of sailing into the Derwent River in Van Diemen's Land, after an absence of 145 days in the Antarctic regions, with his ships in as good condition as when they started, with every man who sailed with him still on

288 SIEGE OF THE SOUTH POLE

board, and all in perfect health. Rarely, if ever, has an explorer come in from unknown seas with so great a load of discovery and so complete an absence of bad news as the Erebus and Terror brought back from the first voyage beyond the 75th degree of south latitude.

CHAPTER XIV

HAIRBREADTH ESCAPES IN THE ICE

"The ice was here, the ice was there,
The ice was all around.
It cracked and growled, and roared and howled
Like noises in a swound."

—COLERIDGE.

SIR JOHN FRANKLIN, the last to take leave of the departing ships, was the first to greet the returning heroes of the Antarctic when the *Erebus* and *Terror* dropped anchor in the Derwent on the morning of April 7th, 1841, and it is easy to imagine the enthusiasm of the "heroic sailor soul" when he heard of the great achievements of the summer. Communication with the mother-country was slow in those days and three months had to elapse before the news was received in London. Amongst all who were interested in the progress of discovery or in the affairs of the navy there was but one feeling of satisfaction and pride that the renewal of British naval exploration had been rewarded with such splendid results. The Royal Geographical Society, though it had taken no part in promoting the expedition, was prompt in its praise, and at the next distribution of its annual awards the Founder's Medal was adjudged to Captain Ross.

For the wearied members of the expedition the stay in Hobart was paradise enough. They were fêted by the Governor and the people. A special play entitled

290 SIEGE OF THE SOUTH POLE

"The Antarctic Expedition" was composed and performed in their honour, a compliment kindly meant, though as one of the spectators remarked, "it was but rather indifferently got up and not much better acted." There were parties and picnics ashore, and in return the officers gave a grand ball on board the two ships. The Erebus connected with the shore for the purpose by a covered bridge of boats, was the ball-room, the Terror moored close alongside her consort, and entered by covered gangways, was the supper-room, and the entertainment lasted till 4 a. m.

Three months were spent in well-earned rest and refreshment, but by no means in idleness, for the ships were refitted, the magnetic observations kept up, and Dr. Hooker, with the few other members of the expedition who were inclined to scientific studies, made valuable collections in the course of their excursions, which threw much light on the geology and botany of Tasmania.

On July 7th, the two ships sailed for a cruise in the warmer Australasian seas, and a week later they entered Port Jackson. The people of Sydney, who remembered the visit of Bellingshausen twenty years before, and had so recently seen much of the French and American expeditions, were now, for the first time, able to examine ships thoroughly equipped for service in the ice, which had in consequence been able to cross the Antarctic pack and penetrate to the edge of the great barrier. While the Australians satisfied their curiosity and offered their hospitality the Antarctic officers were hard at work installing a magnetic observatory on Garden Island—for the more desirable site at Fort Macquarie, where Wilkes had made his observations in 1839 had been rendered

useless for magnetic work by the erection of fortifications containing such masses of metal in the guns and cannon balls as to disturb the needles. The preparations were delayed by bad weather, and on one day a total rainfall of $8\frac{1}{2}$ inches was registered—one-third of the quantity that usually falls in a year in the east of England. All was ready, however, for the term-day on July 21st, when simultaneous magnetic observations were made at hourly intervals in all parts of the world. This work over, the expedition sailed as soon as the instruments could be dismounted and brought on board.

They left Sydney on August 5th, and the *Erebus* made great efforts to keep ahead of a merchant ship which left the harbour at the same time; but the usual fate of the leading ship of a squadron befell her and she had to shorten sail to wait for the *Terror* to come up, allowing the merchantman to sail away to the great mortification of the man-of-war.

For three months the *Erebus* and *Terror* lay at anchor in the Bay of Islands on the northeast coast of the North Island of New Zealand. Much valuable collecting work was done on shore, but the officers were not allowed to make any long excursions from the ships on account of the growing discontent of the aboriginal Maoris with the ways of the white man. It is not our province to chronicle the holiday tasks of Antarctic explorers; however, two incidents in the direct line of our narrative must be mentioned—the meeting of two foreign men-of-war. One of these was the French corvette *Héroïne*, whose commander gave Captain Ross a chart showing the discoveries of D'Urville, which he had not previously seen. The other was the American corvette *Yorktown*, through whose commander, Captain Aulick, the circumstance of

292 SIEGE OF THE SOUTH POLE

the British expedition having sailed over what was represented as land in Wilkes's map, obtained premature currency with unfortunate results.

The approach of the southern summer at length made it possible to return to Antarctic waters. Live stock and fresh provisions of all kinds had been taken on board until the deck looked like a farmyard, and on November 23rd, 1841, the *Erebus* and *Terror* sailed from the Bay of Islands, accompanied for a few hours by *H. M. S. Favourite*, Commander Sullivan, who was stationed there. The weather proved fine and good progress was made to the southeastward, the object being to endeavour to find a way to the ice-barrier beyond the farthest point reached on the previous trip. Much time was spent on the way in ascertaining the temperature of the sea at great depths in order to find the point at which the temperature was uniform from surface to bottom. It was believed that along a certain line in the Southern Ocean an invariable temperature of 39.5° F. was maintained from surface to bottom all the year round; to the north of this line the surface water was warmer, and to the south of it the surface water was colder than the great mass of water below. Ross located this circle of uniform temperature in $55^{\circ} 18'$ S. on December 13th; but the thermometers with which he was provided were probably not adequately protected against the excessive pressure which prevails at great depths, and consequently the results were not to be trusted. There is, as a matter of fact, no part of the open ocean either in the south temperate or even in the tropical zone where water so warm as 39.5° F. is found at the bottom where the depth exceeds 1000 fathoms.

The weather grew cold and an intense fog set in, con-

cealing each ship from her consort, although they were so near that the orders given on one vessel were distinctly heard on the other. When the fog lifted it was to show the first iceberg, a flat-topped ice-island rising 130 feet above the surface of the water, its sides caverned by the action of the waves and a long line of loose pieces fallen from it tailing away to leeward. This was in latitude 58° S. and longitude 146° W., the meridian on which the new attempt to reach a high latitude was to be made. The course was now altered to due south, and on December 18th, the edge of the ice-pack was met with a little south of the sixtieth parallel. The pack was loose and the ships sailed through it for about thirty miles before it grew heavier and compelled a change of course to the southwest. The look-out from the crow's-nest at the masthead guided the ships from one pool of open water to another through the lightest part of the intervening pack, making slow progress. The life of those seas swarmed about the ships, curious but not alarmed. The numerous whales seemed almost to take the vessels for fellow-cetaceans and they scarcely moved aside for them and once the Erebus passed right over a whale and experienced a shock which started a discussion as to whether the ship had struck the whale or the whale had struck the ship. The opportunity was taken to land the magnetic instruments on a large piece of the floe in order to reverify the correction allowed for the attraction of the iron on board.

The Antarctic Circle was approached on Christmas day, the ships working to and fro in the pack wherever a lead seemed to open, and usually shrouded in fog. But the few miles required to reach the Antarctic regions proper were not made until the end of the year. On the

294 SIEGE OF THE SOUTH POLE

30th the wind fell and the two ships were moored, one on each side of the largest piece of floating ice, so that they might not drift against each other and get damaged. Twelve tons of ice hewn from the floe were taken on board the Erebus to replenish the water supply, and some of the ship's company found it a very chilly cargo as it gradually melted on the deck. The magnetic instruments of both ships were tested on the mass of ice that formed a fender between them, and when the fog closed thickly around them one great source of anxiety was removed for a collision between the two vessels was impossible. The mass of ice projecting beyond the ships fore and aft also acted as a buffer against collision with other bergs, while its size was not so great as to prevent some way being made in a favourable wind with both vessels under full sail. The crews of the ships had an opportunity, which they much appreciated, of exchanging visits across the ice, as the Erebus and Terror lay about fifty yards apart the ice became a sort of playground, and a unique ball-room was excavated in it, adorned with statuary hewn out of ice which, in that climate had the permanence of marble. The most ambitious effort was a seated Venus, the combined work of Dr. Hooker and Mr. Davis, the versatile and accomplished second master of the Terror. Here a great celebration was held to bring in the new year 1842. The refreshment room, equipped in true sailor fashion, was a conspicuous feature of the ball-room, and was furnished by the bo'sun, who played the part of landlord of the Antarctic Hotel with a highly symbolic sign depicting Bacchus, Britannia, and other figures surrounding the proud title—"Pilgrims of the Ocean" on one side, and on the other, "Pioneers of Science." The arrival of the New Year

was greeted with all the noise that both the crews could raise, each ship sounding forty-two bells and the men joining in with all manner of musical and unmusical instruments, including the surviving pigs, which the sailors carried bag-pipe fashion under their arms, squeezing them until they became vocal in protest. Both captains entered very heartily into the entertainment which ended in a great snow-ball fight and left something to talk about for many a dreary day to come. After the ball was over the ships drifted across the Antarctic circle and the polar clothing was issued to the men. By a curious coincidence it was on the same day of the previous year that the circle had been crossed on the former voyage some 1400 miles farther to the west.

Progress on this occasion was exasperatingly slow. On January 4th the pack and the ships with it were driven to the northward for twenty miles, so the piece of floe was dropped and the two vessels recommenced their unceasing tacking and wearing in the small pools of open water, scarcely a quarter of an hour passing without having to go about. Then a gale from the south drove them back to 65° 59' S. on the 10th. In such circumstances there was nothing to be done but to hope for a favourable change, and Ross was fortunately able to interest himself in the opportunities of scientific work which abounded. Several of the gigantic penguins first seen on Cook's expedition were killed, the weight of the largest specimen being 75 pounds, and the commander of the expedition skinned some of them and preserved others in pickle with his own hands. The capture of these huge birds was a constant delight to the sailors while in the pack, and two stalwart tars might sometimes be seen marching a solemn penguin in custody toward the ship,

296 SIEGE OF THE SOUTH POLE

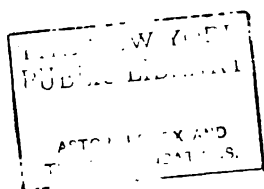
each grasping a flipper. Birds of other kinds, and seals, too, were secured; but those responsible for the expedition must have had anxious thoughts for the future as week after week of the short Antarctic summer went by and the ships still drifted with the pack. There was more immediate anxiety occasionally, for the pack was so loose that it did not stop the ocean swell, and when a gale blew the position of the ships amongst the masses of floating ice was perilous in the extreme.

On January 18th a gale sprang up while the two vessels were slowly forging through the fog, towing between them the heavy mass of floe which held them apart. At midnight the wind went round to the northwest and the plight of the expedition must be described in Ross's own words:

"All our hawsers breaking in succession, we made sail on the ships, and kept company during the thick fog by firing guns, and, by means of the usual signals; under the shelter of a berg of nearly a mile in diameter, we dodged about during the whole day, waiting for clear weather, that we might select the best leads through the dispersing pack; but at 9 p. m. the wind suddenly freshened to a violent gale from the northward, compelling us to reduce our sails to a close reefed main-top-sail and storm-stay-sails; the sea quickly rising to a fearful height, breaking over the loftiest bergs, we were unable any longer to hold our ground, but were driven into the heavy pack under our lee. Soon after midnight our ships were involved in an ocean of rolling fragments of ice, hard as floating rocks of granite, which were dashed against them by the waves with so much violence that their masts quivered as if they would fall at every successive blow; and the destruction of the ships seemed inevitable from



The Erebus and Terror in a Gale in the Pack.
(From Ross's "Voyage to the Southern Seas.")



the tremendous shocks they received. By backing and filling the sails, we endeavoured to avoid collision with the larger masses; but this was not always possible: in the early part of the storm, the rudder of the Erebus was so much damaged as to be no longer of any use; and about the same time I was informed by signal that the Terror's was completely destroyed, and nearly torn away from the stern-post. We had hoped that, as we drifted deeper into the pack, we should get beyond the reach of the tempest; but in this we were mistaken. Hour passed away after hour without the least mitigation of the awful circumstances in which we were placed. Indeed, there seemed to be but little probability of our ships holding together much longer, so frequent and violent were the shocks they sustained. The loud crashing noise of the straining and working of the timbers and decks, as she was driven against some of the heavier pieces, which all the activity and exertions of our people could not prevent, was sufficient to fill the stoutest heart, that was not supported by trust in Him who controls all events, with dismay; and I should commit an act of injustice to my companions if I did not express my admiration of their conduct on this trying occasion; throughout a period of twenty-eight hours, during any one of which there appeared to be very little hope that we should live to see another, the coolness, steady obedience, and untiring exertions of each individual were every way worthy of British seamen.

"The storm gained its height at 2 p. m., when the barometer stood at 28.40 inches, and after that time began to rise. Although we had been forced many miles deeper into the pack, we could not perceive that the swell had at all subsided, our ship still rolling and groaning

298 SIEGE OF THE SOUTH POLE

amidst the heavy fragments of crushing bergs, over which the ocean rolled its mountainous waves, throwing huge masses one upon another, and then again burying them deep beneath its foaming waters, dashing and grinding them together with fearful violence. The awful grandeur of such a scene can neither be imagined nor described, far less can the feelings of those who witnessed it be understood. Each of us secured our hold, waiting the issue with resignation to the will of Him who alone could preserve us, and bring us safely through this extreme danger; watching with breathless anxiety the effect of each succeeding collision, and the vibrations of the tottering masts, expecting every moment to see them give way without our having the power to make an effort to save them.

“Although the force of the wind had somewhat diminished by 4 p. m., yet the squalls came on with unabated violence, laying the ship over on her broadside, and threatening to blow the storm sails to pieces; fortunately they were quite new, or they never could have withstood such terrific gusts. At this time the *Terror* was so close to us, that when she rose to the top of one wave, the *Erebus* was on the top of the next to leeward of her; the deep chasm between them filled with heavy rolling masses; and as the ships descended into the hollow between the waves, the main-top-sail yard of each could be seen just level with the crest of the intervening wave, from the deck of the other: from this some idea may be formed of the height of the waves, as well as of the perilous situation of our ships. The night now began to draw in, and cast its gloomy mantle over the appalling scene, rendering our condition, if possible, more hopeless and helpless than before; but at midnight, the snow,

which had been falling thickly for several hours, cleared away, as the wind suddenly shifted to the westward, and the swell began to subside; and although the shocks our ships still sustained were such that must have destroyed any ordinary vessel in less than five minutes, yet they were feeble compared with those to which we had been exposed, and our minds became more at ease for their ultimate safety.

“During the darkness of the night and the thick weather we had been carried through a chain of bergs which were seen in the morning considerably to windward, and which served to keep off the heavy pressure of the pack, so that we found the ice much more open, and I was enabled to make my way in one of our boats to the *Terror*, about whose condition I was most anxious, for I was aware that her damages were of a much more serious nature than those of the *Erebus*, notwithstanding the skilful and seamanlike manner in which she had been managed and by which she maintained her appointed station throughout the gale.

“I found that her rudder was completely broken to pieces, and the fastenings to the stern-post so much strained and twisted, that it would be very difficult to get the spare rudder, with which we were fortunately provided, fitted so as to be useful, and could only be done, if at all, under very favourable circumstances. The other damages she had sustained were of less consequence; and it was as great a satisfaction as it has ever since been a source of astonishment to us to find that, after so many hours of constant and violent thumping, both the vessels were nearly as tight as they were before the gale. We can only ascribe this to the admirable manner in which they had been fortified for the service, and to

300 SIEGE OF THE SOUTH POLE

our having their holds so stowed as to form a solid mass throughout."

As soon as the gale had subsided the first care was to capture another great fragment of the floe and make it fast between the two crippled ships, while all hands set to work to get the ruins of the ponderous rudders unshipped and hauled up on deck. The carpenters and armourers were at work almost without intermission for two days making good the damage to the rudder of the Erebus, and constructing an entirely new rudder for the Terror to keep in reserve while the spare rudder carried on board was fitted to the ship. By the evening of January 24th the repairs were complete and full sail was made on both ships, but without making any progress through the pack which was now drifting bodily northward at the rate of about half a mile per hour. After all the efforts of the officers and men, all the buffetings of the ships, they were again in almost the same position which they had gained three weeks before.

On January 26th the pack loosened and a northerly gale enabled the ships at last to move more rapidly than the great icebergs that had so long convoyed them in their drift. Next day the ships unmoored from the floe and resumed their individual struggle with the ice, but when at last an observation of the sun was possible on the 28th, they were found only to have reached $67^{\circ} 39' S.$ on the meridian of $156^{\circ} W.$ After forcing their way through more than 800 miles of pack-ice the Erebus and Terror were thus only half a degree, or 30 miles farther south than Cook had been on the same meridian without entering the pack at all. This is only an example of the uncertainties of polar exploration in ignorance of the laws of ice-drift or the causes which make one season

differ so remarkably from another, and there was nothing for it but to struggle on, trying to make way toward the southwest where there was some appearance of the existence of open sea. The situation was difficult, and to add to the troubles of the Terror an alarm of fire was raised and two feet of water had to be pumped into her hold before it was extinguished, but fortunately no harm resulted, as the smoke had been caused by the roasting of some wood which had been stowed inside the pipes of the hot air stove and forgotten until the fire had been lit.

On February 1st the appearance of water-sky grew clearer, and just at dark—for the brief days of the mid-night sun in those latitudes had passed—the edge of the pack was descried with the heavy swell of the ocean beating against the close masses of floating ice and forming a line of fearful breakers. Either a storm or a calm at this juncture might have been fatal. The commander felt that at all hazards he must get his ships through the breakers into the open sea while the breeze held and the weather was good, for any delay in that zone of turmoil would mean severe damage and perhaps destruction. The wind was rising and it was necessary to shorten sail, but at midnight the Erebus reached the belt of broken water at the edge of the pack, and after two hours of terrific thumping and straining the two ships gained the open sea southwest of the pack in $67^{\circ} 29'$ S. and 159° W. The object now was to advance southward and at the same time keep as far to the east as possible so as to strike the great Southern Barrier beyond the point to which it had been followed the previous year. The edge of the pack, however, was found to run south and east, and as the season was now far advanced it was hopeless to think

302 SIEGE OF THE SOUTH POLE

of penetrating it again in the expectation of getting farther to the east, so the only course was to follow the edge of the pack, keeping as close to it as possible and losing no opportunity of getting to the south.

On February 8th in $70^{\circ} 30' \text{ S.}$ and $173^{\circ} 10' \text{ W.}$ a huge iceberg was observed measuring about four miles in diameter, and identified by Ross with a berg which had been seen on February 13th, 1841, in $76^{\circ} 11' \text{ S.}$ and $172^{\circ} 7' \text{ W.}$ If the identification was correct this proved an average drift of nearly one mile per day for the year in a northerly direction.

Strong winds, fog, and driving snow made it impossible to keep the course so that the ships were driven to the westward of the 180th meridian before reaching 75° S.

It was now past the middle of February and three days earlier in the previous year the formation of new ice had forced the expedition to turn back from following the great barrier towards its eastern termination. A fortunate shift of the wind to the northward enabled a good stretch to the southeast to be covered and at last, on February 19th, a strong ice-blink in the south proclaimed the vicinity of the great barrier. The depth of the sea was only 250 fathoms, but still the barrier was not in sight. The wind shifted to the southward and the air grew very cold, the thermometer dropping to 19° F. ; yet this was 7° warmer than the year before, and the ships were now in open water, thirty miles farther east than the pack had reached in 1841. The decks and rigging were encased in frozen spray, and the crews suffered severely in the endless work of breaking off the ice from the hull to ease the ship, and from the tackle to let the ropes run freely.

So intense was the cold, on this occasion that a small fish which was dashed against the bows of the Terror was frozen to the ship and speedily buried in a block of ice. When hacked out and set aside for scientific description the ship's cat unfortunately spied the specimen and discussed it with a satisfaction not shared by the disappointed surgeon, who hoped to have made the discovery of a species "new to science." The Terror's cat indeed seemed possessed by a rooted hatred of scientific work, for not long before she had got into a drawer in the chart-table and torn up several of the original track-charts, to the sorrow and trouble of the second master, who was responsible for them.

On February 22nd in latitude $76^{\circ} 42'$ S. a sounding was obtained in 190 fathoms and the surrounding icebergs seemed to be aground. With a fair north wind the ships were speeding southward, when, just before midnight the great barrier was sighted at last. Next morning the ships turned eastward five or six miles from the vertical cliffs of ice and hopes once more rose high that in spite of the lateness of the season they might reach the end of the huge ice-wall and there find a way open to the south. Young ice soon blocked the way, but on February 28th the ships sailed to within a mile and a half of the barrier where progress was stopped by masses of broken fragments cemented together by young ice. This was the extreme point reached by Ross, and for sixty years it remained the highest southern latitude attained by any man. The mean latitude calculated from the observations of the two ships was $78^{\circ} 9' 30''$ S., and the longitude at that point was $161^{\circ} 27'$ W. The sea was 290 fathoms deep, and as the ice-cliffs forming the barrier were only 107 feet high at the highest part and very

304 SIEGE OF THE SOUTH POLE

considerably lower elsewhere, Ross concluded that it must be afloat.

Towards the east the barrier trended northeastward, and in sailing along it the expedition found parts where the height was only about 80 feet, and it was possible to get a good view of the top of the ice from the mastheads. It was seen to rise to the south in such a manner as to suggest the possible existence of land beneath the icy covering. This appearance must have been much less marked than the non-existent Parry Mountains which Ross never doubted he had sighted the year before. In view of the recent discovery of King Edward VII Land the reasons which threw doubt on the existence of land in this direction in 1842 deserve to be set forth in detail. Ross says:

“ . . . We perceived from our mastheads that it gradually rose to the southward, presenting the appearance of mountains of great height, perfectly covered with snow, but with a varied and undulating outline, which the barrier itself could not have assumed; still there is so much uncertainty attending the appearance of land, when seen at any considerable distance, that, although I, in common with nearly all my companions, feel assured that the presence of land there amounts almost to a certainty, yet I am unwilling to hazard the possibility of being mistaken on a point of so much interest, or the chance of some future navigator under more favourable circumstances proving that ours were only visionary mountains. The appearance of hummocky ridges and different shades, such as would be produced by an irregular white surface, and its mountainous elevation, were our chief grounds for believing it to be land, for not the smallest patch of cliff or rock could be seen protruding on any part of

the space of about thirty degrees which it occupied. I have, therefore, marked it on the chart only as an 'appearance of land.' "

The day, it should be added, was beautifully fine, the clearest and brightest of the cruise, according to McCormick. Curiously enough Ross appeared to attach no significance as signs of the proximity of land to the numerous hauls of stones he had made with the dredge from the bottom of the sea, or to the several cases of icebergs with pieces of rock embedded in their substance which he recorded from the neighbourhood of his farthest south. These were really strong confirmatory evidence.

On February 24th the main pack was found extending right up to the edge of the barrier, and the intensity of the cold made it quite plain that there was no more polar work to be done that season. The attempt to reach a high Southern latitude had been far less interesting in its outcome though more dangerous and laborious than that of the previous year, the net result being an advance of some six miles towards the pole and the doubtful discovery of land about the meridian of 160° W. This result, slight as it was, was not accomplished without great risk, and it was indeed very nearly too late to return. The sea as far as the eye could reach from the masthead was a continuous sheet of new ice, through which only a strong wind could force the ships. Fortunately a strong southeasterly breeze was blowing and by crowding all canvas even to royals and studding-sails the Erebus and Terror tore through the young ice for thirty miles to north-westward and regained the open sea. The object now was to follow the edge of the pack northward, and take the shortest course across the South Pacific Ocean to the Falkland Islands, where it was intended to winter.

306 SIEGE OF THE SOUTH POLE

Fine weather favoured the northward run and on March 1st the ships crossed the 180th meridian and the 70th parallel still keeping to the northwest following the edge of the pack, which lay to the eastward studded with a range of gigantic icebergs. The rise of air-temperature to 36° F. was hailed with delight as if the summer had come. The course was now set more easterly, and at 7 p. m. on March 6th, 1842, the two ships crossed the Antarctic circle to the northward after having passed sixty-four days battling with the ice within it, one day longer than in the previous year, and far longer than any other expedition before that time. The course to the northward had kept the ships well out of sight of Victoria Land and except for the "appearance of land" at their most southerly point not a cliff or island had been seen during the two months.

The latitude of 60° S. was reached on March 9th and as the sea was clear of ice Ross ordered a due easterly course so as to reach the Falklands as soon as possible. For three days the sea remained clear and good progress was made, but on the 12th the wind rose and heavy snow showers obscured the lookout. Many small pieces of ice also appeared and Ross had just made up his mind about midnight to lay-to until daylight, when the greatest danger of the whole expedition was suddenly encountered and for one terrible hour the total loss of both ships and all on board appeared to be inevitable. Many of the members of the expedition had been in positions of deadly danger before, but none had ever experienced a more appalling hour of suspense and fear. When it was over some even of those who had borne themselves most calmly confessed that they could not remember what they had done or how the ships had been saved. Four

accounts of the disaster are accessible, the official record by Captain Ross, the subsequent description by Mr. McCormick on the *Erebus*, a contemporary account by Sullivan, the literary blacksmith of that ship and an unpublished letter by Mr. J. E. Davis the second master of the *Terror* and cartographer of the expedition which has been privately printed. The first and the last may be quoted as they are in large measure complementary and between them throw the scene into a sort of stereoscopic relief.

Captain Ross on board the *Erebus* says:

“ . . . A large berg was seen ahead and quite close to us; the ship was immediately hauled to the wind on the port tack, with the expectation of being able to weather it; but just at this moment the *Terror* was observed running down upon us, under her top-sails and fore-sail; and as it was impossible for her to clear both the berg and the *Erebus*, collision was inevitable. We instantly hove all aback to diminish the violence of the shock; but the concussion when she struck us was such as to throw almost everyone off his feet; our bowsprit, fore-topmast, and other smaller spars, were carried away; and the ships hanging together, entangled by their rigging, and dashing against each other with fearful violence, were falling down upon the weather face of the lofty berg under our lee, against which the waves were breaking and foaming to near the summit of its perpendicular cliffs. Sometimes she rose high above us, almost exposing her keel to view, and again descended as we in our turn rose to the top of the wave, threatening to bury her beneath us, whilst the crashing of the breaking upperworks and boats increased the horror of the scene. Providentially they gradually forged past each other,

308 SIEGE OF THE SOUTH POLE

and separated before we drifted down amongst the foaming breakers, and we had the gratification of seeing her clear the end of the berg, and of feeling that she was safe. But she left us completely disabled; the wreck of the spars so encumbered the lower yards, that we were unable to make sail, so as to get headway on the ship; nor had we room to wear round, being by this time so close to the berg that the waves, when they struck against it, threw back their sprays into the ship. The only way left to us to extricate ourselves from this awful and appalling situation was by resorting to the hazardous expedient of a stern board, which nothing could justify during such a gale and with so high a sea running, but to avert the danger which every moment threatened us of being dashed to pieces. The heavy rolling of the vessel, and the probability of the masts giving way each time the lower yard-arms struck against the cliffs, which were towering high above our mastheads, rendered it a service of extreme danger to loose the main-sail; but no sooner was the order given, than the daring spirit of the British seaman manifested itself—the men ran up the rigging with as much alacrity as on any ordinary occasion; and although more than once driven off the yard, they after a short time succeeded in loosing the sail. Amidst the roar of the wind and sea, it was difficult both to hear and to execute the orders that were given, so that it was three-quarters of an hour before we could get the yards braced by, and the maintack hauled on board sharp aback—an expedient that perhaps had never before been resorted to by seamen in such weather: but it had the desired effect; the ship gathered sternway, plunging her stern into the sea, washing away the gig and quarter boats, and with her lower yard-arms

scraping the rugged face of the berg, we in a few minutes reached its western termination; the "undertow," as it is called, or the reaction of the water from its vertical cliffs, alone preventing us being driven to atoms against it. No sooner had we cleared it, than another was seen directly astern of us, against which we were running; and the difficulty now was to get the ship's head turned round and pointed fairly through between the two bergs, the breadth of the intervening space not exceeding three times her own breadth; this, however, we happily accomplished; and in a few minutes after getting before the wind, she dashed through the narrow channel, between two perpendicular walls of ice, and the foaming breakers which stretched across it, and the next moment we were in smooth water under its lee."

As befits a commander, Ross painted the accident from the point of view of the expedition, but McCormick added several human touches. All hands had been called on deck at a moment's notice, the sense of danger after the first collision drove all other ideas from their minds, and in the bitter cold of the Antarctic night they rushed to their stations in the scantiest of clothing—one officer is described as "clinging to the capstan in his nightshirt only."

Davis in the letter to his sister after describing the collision with the *Erebus* goes on to say:

"All this time we had been bodily drifting on the bergs so that when we cleared the *Erebus* we found an enormous iceberg close under our lee. A dreadful shipwreck and death then appeared inevitable; there was no alternative but to run for the dark place we had seen before, which might be an opening, or be smashed on the face of the cliff. The helm was immediately put a-starboard,

310 SIEGE OF THE SOUTH POLE

and with the assistance of the sails she answered it very well. We were immediately rushing past an enormous berg, the ship being perfectly covered with the foam caused by the sea breaking against it. Every moment we were expecting the ship to strike ice right ahead. 'Hard-a-port' was screamed out from forward (then indeed hope died within us); 'Hard-a-port; brace round the head-yards.' 'Shiver the main top-sail,' cried the Captain, as if he were steering into any harbour. The men flew to the ropes, although I should think at that moment that there was not one on board but thought all hope was fled. She came round, and passed through an opening between two bergs not twice the breadth of the ship, the foam and spray dashing over us on each side as we passed. Several other alarms were given owing to the brash (small stuff washed from the bergs) looking like more bergs in the darkness, but we were safe, but did not know it. The next cry was 'Where's the *Erebus*?'—our own danger had made us entirely forget her for the time. All eyes were immediately straining through the gloom to find her. We burnt a blue light, and soon after had the happiness of seeing her burn one which we immediately answered; we knew then that she was safe, which with her losses we never expected. We then lay-to, anxiously waiting for daylight to find the extent of her damages. As soon as it could be distinguished she made the signal that: 'All was well, and that they could repair all their damages.' We answered: 'Thank God, we are the same.' . . . We might go a thousand times more to the South Pole without experiencing one-half the dangers we have this time. The following diagram may give you an idea of our situation, in which the arrow denotes the direction of the wind; the red the *Terror*,



The Erebus and Terror in Collision.
(From Ross's "Voyage to the Southern Seas.")

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and the black the *Erebus*; the dotted line the passage the ships made through the water. You are to suppose yourself looking down on their decks, and the strokes across the ships are the way the yards were braced. I cannot



DAVIS'S DIAGRAM OF THE COLLISION BETWEEN THE EREBUS
AND TERROR.

attempt any sketches of the ships with my pen and ink, it would be impossible to give the slightest effect of the intense darkness, etc. You may imagine the force with which the *Erebus* struck us when I tell you that her spare anchor in the act of falling must have come in collision with our side, which drove the palms of it right into her

312 SIEGE OF THE SOUTH POLE

through copper and all; that in this way she conveyed it 800 miles, when it must have worked out."

No time was lost in getting the damage temporarily repaired, and although the crippled ships had to run before the wind into lower latitudes while the rigging was being renewed, as soon as they could be handled properly Ross turned south again to the sixtieth parallel to make a series of observations at one of the foci of maximum magnetic intensity in 60° S. and 125° W. This was successfully done on March 18th and on that day also the anchor that had been driven into the skin of the Erebus by the collision and had hung there for five days greatly impeding her progress, worked loose and sank in deep water. The voyage was slow for the ships sailed heavily, but it was devoid of incident until April 2nd, when one of the quartermasters of the Erebus fell overboard from the main yard, and as the sea was running too high for a boat to live had it been lowered an unsuccessful attempt was made to bring the ship alongside the life-buoy on which the man had climbed, but before the manœuvre could be executed he lost hold and was drowned, the third to be so lost from this ship. Next day off Cape Horn a brig was sighted the first sail met with since leaving New Zealand more than four months before, but it was blowing too hard to speak her. No land was seen until Beauchêne Island was made on April 5th, and next day the ships dropped anchor in Port Louis, Falkland Island, 137 days after leaving the Bay of Islands. To the disappointment of all on board there were no letters, but from a chance copy of the Navy List four of the officers discovered that they had received promotion on the day when Captain Ross's report on the first voyage reached the Admiralty.

HAIRBREADTH ESCAPES 313

Although disappointing in its results compared with the first, the second summer of the expedition in the Antarctic regions had been by far the more trying of the two. Twice both ships had been in the direst peril and were only able to proceed on their voyage because of the forethought which had provided abundant spare gear to replace losses. Scientific observations of considerable interest were made, although the deep-sea temperatures on which Ross had bestowed much attention were rendered useless by the unsuspected imperfection of the instruments employed.

CHAPTER XV

THE LAST ANTARCTIC VOYAGE OF THE EREBUS AND TERROR

"We have had enough of action, and of motion we,
Roll'd to starboard, roll'd to larboard, when the surge was
seething free,
Where the wallowing monster spouted his foam-fountains in
the sea."

—TENNYSON.

THE first care on arriving at Berkeley Sound in the Falkland Islands was to send home dispatches and the scientific collections and to take steps for overhauling the ships. Both vessels were unloaded of all stores, hauled up as far as possible on the shore at the top of high water, and while beached their hulls were thoroughly examined and repaired. At that date the small settlement in the Falklands could offer little in the way of its own resources except fresh meat, and even that the blue-jackets had to hunt for themselves, for the herds of cattle and horses roamed the island in an absolutely wild state. No spar suitable for making a new bowsprit for the Erebus could be obtained, but an urgent request had been sent on to the headquarters of the South American squadron at Rio de Janeiro, and toward the end of June H. M. S. Carysfort commanded by Lord George Paulet arrived bringing all that was required to refit the expedition. It was the end of July before the Erebus and Terror had been refitted and were ready for sea. Another month had still to be devoted to magnetic observations on shore, and it was no easy task for the commander

THE EREBUS AND TERROR 315

to find exercise and occupation for the men. A piece of unenclosed ground had hitherto served as the burial place for the settlement, and this the blue-jackets were set to work to surround by a stone wall not likely soon to be destroyed, for it was seven feet high and seven feet thick. To the newly-enclosed cemetery the sailors removed the remains of Matthew Brisbane, who had been in charge of the cutter which accompanied Weddell on his great voyage to the south. The colony at that time had a total resident population amounting to only 46. While the Antarctic ships were lying in Berkeley Sound Captain Allen Gardiner, a retired naval officer, with his family arrived there in a schooner and waited for an opportunity to cross to Patagonia and prepare the way for a mission to the South American natives. The touching story of his efforts to bring Christianity to the Patagonians and his tragic fate are amongst the classics of the history of missions. It so happened that forty years afterwards the mission vessel bearing his name rescued from shipwreck the leader of a projected Italian Antarctic expedition.

At the request of the governor, Ross spent a week in examining the harbour of Port Louis, the site of the existing settlement in Berkeley Sound and Port William, somewhat farther to the southeast. He strongly recommended the latter as in every way more suitable for the seat of government, and the present town of Stanley is situated in Port William accordingly.

Dr. Hooker made a careful survey of the botany of the islands and drew attention particularly to the gigantic sea-weeds which fringe the harbours and the remarkable tussock grass characteristic of the rocky shores.

A magnetic station was left at Port Louis when the

316 SIEGE OF THE SOUTH POLE

ship sailed on September 4th for a short exploring cruise in search of a protected harbour in the immediate neighbourhood of Cape Horn. It was put under the charge of Lieutenant Sibbald, senior lieutenant of the Terror in succession to Lieutenant McMurdo whose health had broken down under the strain and who was now invalided home. He was a remarkably efficient officer, after Ross the best executive in either ship, and to judge from the regretful comparison with the senior lieutenant of the Erebus which McCormick was never tired of making, he was less out of sympathy with natural science than most naval officers of his generation.

Cape Horn was passed on the 19th on a fine day at the distance of a mile and a half, and Ross acknowledged that he was disappointed with the appearance of a cape which had won for itself so abominable a notoriety. At St. Martin's Cove in Hermite Island immediately to the northwest of the Horn, the ships anchored and a magnetic observatory was landed on September 21st. Sir Joseph Hooker recalls how on term days when all the executive officers were on shore with the magnetic instruments he was left on watch on board with hourly readings of the barometer to make for the twenty-four hours, and he has never forgotten the hideous "Willie waws" or squalls that swept down the valleys and smote the water of the cove with such violence that the ships were in danger of being torn from their anchors and driven to destruction on the Horn island. The mean level of the sea was ascertained at this station, as at other anchorages, by numerous observations and a permanent mark cut in the rock to record it. The long stay at this anchorage was enlivened to some extent by visits from the native Fuegians; but it must have been a dull time at best for

THE EREBUS AND TERROR 317

the ships' companies; by no means to be compared with the "refreshment" between south polar cruises afforded to Captain Cook's companions in the paradise of the tropical Pacific islands.

On November 7, 1842, the expedition left St. Martin's Cove, and reached Port Louis again on the 13th. This time letters from home were waiting, including the congratulations of the Admiralty on the earlier work of the expedition, and official permission to spend a third year in exploration if Ross thought it desirable. A merchant ship, the Governor Halket, had put in from Sydney on her way to England, and Ross sent his men on board to help to unload her and stop a leak which had nearly caused her loss. Living up to his rule never to permit idleness, the remainder of the crews were set to work planting about eight hundred young trees taken from the less bleak Fuegian islands, so that the Antarctic expedition left substantial improvements behind it. Magnetic and tidal observations were kept up to the last while the ships were being got ready for sea, and on December 17th, 1842, the expedition left Port Louis for the third consecutive summer in the south polar ice, no one on board feeling any regret at leaving this poor substitute for a civilised seaport.

The intention was to go south on the meridian of 55° W. in the expectation of meeting with a continuation of Louis Philippe Land, by following which it was hoped to combine a survey of the coast with the attainment of a high latitude. Should the way to the south not be open it was intended to endeavour to follow in Weddell's track of 1823 on which it seemed probable that an open sea would be met with extending to a very high latitude. The first iceberg was met in latitude 61° S. on

318 SIEGE OF THE SOUTH POLE

Christmas Eve, and a gale of wind accompanied it which lasted through Christmas Day though it did not disturb the due celebrations. On the 26th the ships came up with the edge of the pack in 52° W. longitude, and sailed along it toward the west so as to get between the floating ice and the land. Joinville Land was sighted on December 28th, and the rugged forms of the mountains were examined with great attention. Captain Crozier and the officers of the *Terror* believed that they saw smoke issuing from one peak to the southward, but Captain Ross and the officers of the *Erebus* were of opinion that it was merely a wreath of mist or possibly snow-drift flying before the wind. The probability is that the *Terror* was right, as active volcanoes were discovered fifty years later in the same direction, which might have been visible from the ships. The weather was unsatisfactory, so that the position of the prominent points on the land could not be fixed by astronomical observations; but the extraordinary extent of the snow and ice-covering for the latitude was plainly seen, and Ross called attention to the way in which the glaciers descending to the sea broke off in ice-cliffs 100 feet high, a miniature copy of the great Southern Barrier. A strong tide or current was surging southward along the coast, swirling through a chain of grounded bergs, and moving so rapidly as sometimes to hamper the steering of the ships. A group of rocky islets almost concealed by the grounded bergs suddenly appeared and made it necessary for the ships to bear off to the eastward, and in so doing through the fog they nearly ran against the southernmost of the group appropriately named the Danger Islets. This particular rock rose so perpendicularly from the water that a ship could have been laid

THE EREBUS AND TERROR 319

alongside it, and Ross records: "I named it Darwin Islet, after Charles Darwin, Esquire, the talented companion of Captain Fitzroy during his interesting voyage."

Here again, as off Victoria Land, the number and tameness of the whales struck the explorers, and Ross was never weary of expatiating on the great cargoes of oil which might be obtained. In the present instance he appears to have believed the opportunities for whaling to be of enormous importance, and to have attached to the little chain of islets a value that one can hardly understand, for he says:

"Thus within ten days after leaving the Falkland Islands, we have discovered not only new land, but a valuable whale-fishery well worthy the attention of our enterprising merchants, less than six hundred miles from one of our own possessions."

The enterprising merchants, however, took exactly half a century before they made up their minds to send a ship to investigate the whale fisheries of Weddell Sea.

On December 30th the bold outline of Joinville Land, discovered by D'Urville, was clearly seen and the mountains behind it, to a number of which Ross gave the names of naval officers who had assisted the expedition when at the Falkland Islands. A remarkable tower-shaped rock on the south side of Joinville Land he afterwards named D'Urville's Monument, in honour of the versatile French Admiral who had discovered the land. On New Year's Day, 1843, the ships were becalmed off the land in 64° 14' S., and the usual distribution of warm clothing was made to the men, although they had not the satisfaction of crossing the Antarctic circle as on the two previous New Year's Days. A fine mountain

320 SIEGE OF THE SOUTH POLE

rising to 7050 feet was named Mount Haddington, after the First Lord of the Admiralty, and a small island was called Cockburn Island, after the senior Naval Lord.

The weather became thick and stormy and the ice was very troublesome, so that nearly a week was spent dodging about in the pack off Cockburn Island. On January 6th the two captains landed on the island, hoisted the British flag and took formal possession in the name of the Queen. Dr. Hooker accompanied them and found that the only plants growing on the volcanic soil of this land on the edge of the Antarctic were nineteen species of minute mosses, algæ and lichens. McCormick the senior surgeon remained on board fuming and fretting, after vainly beseeching the captain to relax his inexorable rule never to leave the ships without one medical officer on each. The white petrel, whose breeding place had not been found previously, was discovered nesting on the island.

The ships proceeded to grope their way southward along a narrow channel between the land and a chain of grounded bergs. It was an unfortunate choice, for the pack grew closer and the ships were beset before they reached the 65th parallel. After a week's incessant struggling to return or escape to the westward, in which all hands were well nigh exhausted, the ships forced their way into open water on January 17th. The main pack lay to the east, and as it seemed to involve too great a detour to attempt to turn it by the north, Ross decided to run the ships into it in the hope of forcing a way through to the southeast. The attempt was a complete failure, for the pack was too close to sail through, and it was drifting north so rapidly that at the end of the month the Erebus and Terror, after heading south-

THE EREBUS AND TERROR 321

ward for a week, were actually farther north than when they entered. New ice was forming and it was evident that unless the ships could be extricated speedily they would run a serious risk of remaining fast for a year. Several days' struggle brought them out in latitude 64° S. on the northern side of the pack, and the first part of the programme having already consumed six weeks, with no result so far as a high latitude was concerned, it remained to try to carry out the second part, the repetition of Weddell's cruise on the fortieth meridian.

The expedition accordingly skirted the pack toward the east, keeping in the open water, the temperature of which was a sure index of the proximity of floating ice even in the thickest fog. On February 14th Weddell's track was crossed, but there was no way open to the south. The edge of the pack was in latitude $65^{\circ} 13' S.$, some 75 miles farther south than when D'Urville passed that way four years before, but very different from the time when Weddell found no ice for 550 miles farther south. D'Urville had cast doubt on Weddell's veracity and obviously did not believe that there ever had been open sea to beyond the 70th parallel. According to McCormick, Ross did not wish to follow in the track of Weddell or anyone else and deliberately passed the position, but it is impossible to accept this suggestion for the leader himself refers repeatedly to his desire to get south on Weddell's track and nothing but the position of the ice prevented him from doing so. He says:

" . . . we must conclude that Weddell was favoured by an unusually fine season, and we may rejoice that there was a brave and daring seaman on the spot to profit by the opportunity."

On February 26th, still following the edge of the ice,

322 SIEGE OF THE SOUTH POLE

the Erebus and Terror reached the meridian of 12° W. and found at last that the edge of the pack trended southward. Following it up and working westward as well as southward through fog and snow, Ross crossed the Antarctic circle on March 1st, 1843. Next day the sun appeared unclouded for the first time for six weeks, and the early part of the day was magnificent though the sea was rough. The latitude was found to be $68^{\circ} 14'$ S. and the longitude $12^{\circ} 20'$ W. The following day was calm, and the boats were got out with the longest sounding-lines to make a deep-sea sounding. Four thousand fathoms, or 24,000 feet of line were coiled on a huge drum in one of the boats and the whole length ran out without the bottom being found. It was the deepest sounding ever made up to that date, and as Ross was experienced in the work and the conditions were entirely favourable, it seemed not unreasonable to believe that a very great depth existed in that position. The recent soundings of Mr. W. S. Bruce in the Scotia within one mile of Ross's position however, make it plain that the thick hemp line, caught by the strong undercurrent which runs there, floated the comparatively light sinker employed and so gave a fallacious reading. The real depth proved to be 2,660 fathoms. Temperatures were observed down to 1,050 fathoms, but as in the rest of Ross's deep-sea soundings what he measured was not the temperature of the water but the compression of the thermometer bulb, for his instruments were defective.

On March 4th the 70th parallel was crossed about midway between the tracks of Weddell and Bellingshausen. Next day the pack was sighted, and as the ice seemed open at the edge the ships were run into it for a distance of 27 miles, when the pack became close and

THE EREBUS AND TERROR 323

heavy with new ice forming thickly in the pools and lanes of water. Farther progress was barred in latitude $71^{\circ} 30'$ S., longitude $14^{\circ} 51'$ W., and the third attempt of the expedition to reach the south pole had to be given up. The colours were hoisted in a last salute to the southern ice, and a barrel was thrown over containing a statement of the position and date signed by all the officers.

The barometer was falling rapidly and the wind rising as the two ships picked their way out of the pack. Once outside a fierce gale descended upon them, and two days and nights of the greatest anxiety followed, for it was almost more than the ships could do to weather the pack, the front of which was now a roaring line of surf. But the danger passed as it had so often passed before, and on March 11th, 1843, the two ships recrossed the circle and emerged from the Antarctic regions for the last time. Their work was done.

It cannot be said that the third season added much to the success of the expedition, the chief glory of which was achieved in the first. The terrible strain of the last two years had told heavily on the officers. Ross himself was not the man he had been. It may be that the third season was the worst of the three so far as ice and weather went; but it is possible also that the jaded leader had lost something of the clear perception and quick intuition that had led him so triumphantly at the first. Not that he failed for a moment in courage or resolve, but from the time of leaving New Zealand circumstances had been all against him. A final disappointment remained in the unsuccessful issue of the attempt to locate that child of the mist, Bouvet Island. It would almost seem as if the island were invisible to naval officers.

324 SIEGE OF THE SOUTH POLE

Cook could not find it, Ross could not find it, Moore on the Pagoda failed to see it, but between these attempts several of the Enderbys' whaling skippers had visited and even landed upon islands in that neighbourhood.

On March 10th the appearance of a remarkable beam of light in the sky attracted attention, and at first it was taken for an auroral display, though its true nature as the great comet of 1843 was speedily recognised.

Ross crossed the meridian of Greenwich in latitude $54^{\circ} 8' S.$, and at noon on March 22nd his latitude was $54^{\circ} 11' S.$ and longitude $6^{\circ} E.$ He says, "Bouvet Island should therefore have been in sight, bearing $S. 55^{\circ} E.$, distant nine miles. We stood exactly towards it until we had run twelve miles, but not seeing it we steered east to keep in its supposed latitude."

Ross did not then know that Lindsay in the *Swan* had sighted an island in $54^{\circ} 24' S.$, $3^{\circ} 15' E.$ in 1808, but after hearing of this from Mr. Enderby he was still of opinion that the island did not occupy that position which he had passed so close as certainly to have seen any land that might be there. The island however does lie in $54^{\circ} 26' S.$ and $3^{\circ} 24' E.$ or only two miles south and about five miles east of the position assigned by Lindsay so that the *Erebus* and *Terror* would seem to have passed in sight of it although the island was not distinguished from the bergs, so difficult is it even for the most practised eyes to recognise the difference between a distant island of floating ice and one of ice-covered rock.

There was a great abundance of icebergs that season and the ships were never out of sight of them until they reached the latitude of $47^{\circ} 40' S.$ Land was sighted on April 4th, 1843, and by the evening of that day the *Erebus* and *Terror* dropped their anchors in Simon's Bay, beside

THE EREBUS AND TERROR 325

the flagship of the South African squadron H. M. S. Winchester. For the third time they had come back after a long and trying sojourn in the Antarctic ice without a single name on the sick list. Although no one was actually disabled on board, the three years of ceaseless work and wearing anxiety had told heavily on the officers. They were not the sort of men to complain, and after a brief stay to refit the ships they sailed again on April 30th, homeward bound. The voyage was interrupted at St. Helena, Ascension and Rio de Janeiro to complete the magnetic observations at those stations.

On the homeward voyage another attempt to sound in very deep water was made in latitude $15^{\circ} 3' S.$ and longitude $23^{\circ} 14' W.$ The day was nearly calm, the water quite smooth, and 4600 fathoms of line were run out without finding bottom. Subsequent soundings in that part of the ocean make it appear unlikely that the depth is nearly so great, and it seems probable that the line continued to be drawn off the reel by currents after the lead had reached the bottom.

It was not until September 2nd that the English coast was at length sighted, and rarely if ever before did two men-of-war return to port after so long a commission. On September 23rd, 1843, when the ships were paid off at Woolwich, it was more than four years and five months since they had commissioned at Chatham.

Ross was received with the welcome that so unique and successful an expedition deserved. He received the honour of knighthood, the gold medals of several societies, of which that presented by the Paris Geographical Society perhaps gratified him most, and as the best reward it was currently reported and even announced in responsible papers that he was destined for the com-

326 SIEGE OF THE SOUTH POLE

mand of a still greater expedition then under discussion which had for its object the final solution of the oldest of Arctic problems, the existence of a North-West Passage.

Except for a voyage to the Arctic regions in 1848-49, when he commanded H. M. S. Enterprise in the search for Franklin, Ross had no more sea-service. He married immediately after his return and devoted himself to literary work and the study of the collections of marine invertebrates made by himself in the Antarctic regions. He died at Aylesbury on April 3, 1862.

CHAPTER XVI

THE GENERATION OF AVERTED INTEREST

"The best-laid schemes o' mice and men
Gang aft agley."

—BURNS.

IMMEDIATELY after the return of the *Erebus* and *Terror* it became evident that the absence of magnetic observations in high latitudes south of the Indian Ocean would detract from the value of the data brought back by the expedition, and the Admiralty resolved that having done so much they would complete the work.

Orders were accordingly sent out in the summer of 1844 to Admiral Percy, Commander-in-Chief at the Cape of Good Hope, to select and equip a vessel for the purpose. His choice fell on the *Pagoda*, a merchant barque of 360 tons, which was hired, fitted out and manned by a crew of thirty-five volunteers from the flagship *H. M. S. Winchester*. Most of the six officers came from the same ship, but the command was given to Lieutenant T. E. L. Moore, R.N., who had been Mate on the *Terror* during the Antarctic Expedition, and he arrived from England at the beginning of January, 1845. The ship was ready for sea and left Simon's Bay without a day's unnecessary delay on January 9th. Lieutenant (now Major-General) Henry Clerk, R.A., joined the expedition as magnetic observer. The *Pagoda* met the first icebergs on the 25th, in latitude $53^{\circ} 30' S.$ on her way to the assigned position of Bouvet Island, the search for which was the first incident in the voyage. As Bouvet Island

328 SIEGE OF THE SOUTH POLE

was looked for in 6° E., naturally enough nothing was seen of it. Moore knew from Ross's failure that the position must be wrong and he might have deduced the fact that since Cook and Ross had proved that the Island did not lie east of 6° E. it would probably be found considerably farther west in or near the given latitude, for the mistake in position would most likely be in longitude, but he turned southward before reaching 3° E., and added one more to the list of unnecessary failures. The Admiralty sought no more for the island which has never been seen by a British naval officer, and it was left to be picked up by a pertinacious German merchant captain under the direction of a German man of science half a century later.

When in latitude about $60^{\circ} 45'$ S. and longitude about 4° E. a singular rock was seen capped by a mass of ice. It looked so like land that Moore sounded, and at first thought that bottom had been found at 250 fathoms, but the ship was drifting rapidly before a strong wind, and it remains uncertain whether this was an islet or merely an almost submerged iceberg carrying a great mass of rock. The Pagoda proceeded southeastward, and at length, on February 5th, after seeing a strong ice-blink in the south, she crossed the Antarctic Circle in $30^{\circ} 45'$ E. The edge of the ice-pack was met with on the 11th; it extended in an unbroken line along one-third of the horizon and checked further progress to the south in latitude $67^{\circ} 50'$ S., longitude $39^{\circ} 41'$ E., the farthest point toward the pole reached on the cruise. A course was then set for Enderby Land, but a succession of calms and contrary gales made it impossible to reach the assigned position. Moore had no choice but to try to obey orders, but it would almost seem as if those in authority had issued

their commands in defiance of the facts of nature. Had the orders been to make the voyage in the opposite direction, proceeding eastward through the temperate Indian Ocean to Australia and then running southward and following the edge of the ice-pack toward the west to the meridian of Bouvet Island, the somewhat disappointing cruise of the *Pagoda* might have become an important voyage of discovery. The sailor's duty is to obey and "not to reason why;" and the Admiralty might have had reasons which we do not know for not acting in harmony with the facts of Antarctic meteorology discovered by Cook, confirmed by Bellingshausen, Weddell, and Biscoe, and quite recently supported by Balleny, D'Urville, Wilkes and Ross, which dictated a westerly course for circumnavigation south of 60° S., just as imperatively as the Brave West Winds dictate an easterly course for circumnavigation in the roaring forties. Moore stuck to the hopeless task of trying to drive his ship against the prevailing winds until a furious gale drove him northward to where a fair wind blew and allowed him to proceed eastward in clear seas. Other attempts to get south met with no better success, but the track kept on the poleward side of 60° S. to the meridian of 100° E. On March 7th in 64° S. and some distance east of the fiftieth meridian the ship was surrounded by bergs on the margin of a belt of pack ice ten miles wide beyond which in the intervals between the squalls Moore saw a high ridge of ice or land. He says: "It was more like land than anything before seen during the voyage, and there was no doubt about it; but we would not say it was land without having really landed on it." The ship then bore up to the north because her sailing power had been damaged by the loss of some spars in a heavy gale

330 SIEGE OF THE SOUTH POLE

and there was some risk of her being carried past Australia and failing to beat back to it. She anchored in King George's Sound, Western Australia on April 1st. She had been at sea for eighty-two days, making such magnetic observations as were possible in a small vessel tossing on tumultuous seas and battling with head-winds. Three weeks were spent at Albany, and on April 20th the Pagoda set sail and proceeded across the Indian Ocean to Mauritius, continuing the magnetic observations, and completed her voyage at Cape Town on June 20th, 1845. During this voyage Moore remarks that more icebergs were seen than in the three Antarctic trips of the Erebus and Terror, and he referred with satisfaction to the fact that he had run through more degrees of longitude south of 60° S. than any previous voyager.

The cruise of the Pagoda filled an important gap, and it remains memorable for the fact that it was the last Antarctic expedition carried in a sailing ship without the help of steam. Thus terminated the greatest era in the history of maritime discovery, and the scroll on which Prince Henry the Navigator began to write early in the fifteenth century was rolled up all unconsciously by Lieutenant Moore, R. N., in the middle of the nineteenth. Except for the short cruise of Enderby's ship, the *Brisk*, in 1850, and the momentary swoop of the *Challenger* in 1874, it was more than sixty years before serious exploration in the southern ice was resumed.

In exploration as in physics there is a law of inertia. It is invariably hard to start a new effort to extend knowledge in any direction, but when once begun the tendency is to continue unless stopped by some external force. The brilliant voyages of Ross and Wilkes seemed, both from the discoveries that were made and from the acute-

ness of the controversies they initiated, to promise a succession of South Polar expeditions, one stimulated by the other and not likely to cease until the map of the Antarctic area was at least as clearly outlined as that of the Arctic.

The heart of the American people, however, was never greatly in their Exploring Expedition, and the internal friction within the expedition itself was perhaps sufficient to deter the naval authorities from repeating the experiment, whilst the scientific element naturally preferred to pursue researches in which they met with encouragement and even reward. Thus there was little reason to feel surprised if America had let the thread drop even had the violent cleavage of the nation by the Civil War not occurred. But the British people were at this period profoundly stirred with the spirit of polar discovery. Ross had brought home his crews in a higher state of health and contentment than any captain had perhaps ever done before from a voyage of great duration and difficulty. A new expedition after a few years was the natural, almost the inevitable result, yet for a generation the interest of the country and of the world was averted from the southern ice. The reason of this remarkable circumstance was not the Russian War nor the Indian Mutiny, for the British Navy has not been wont to let war interfere with discovery when the right man has been found to open up a worthy field. One cannot forget that Cook sailed on his last voyage of exploration nearly a year after the American War of Independence had broken out. The real reason was the action of the man who of all men would have most indignantly denied the possibility of his proving a barrier to polar exploration—Sir John Franklin.

332 SIEGE OF THE SOUTH POLE

The Erebus and Terror were no sooner safe at home again than their services were required for a new expedition, this time to attempt the solution of the three-hundred-year-old problem of a North-West Passage from the Atlantic to the Pacific. The question of the command received some anxious thought at the Admiralty. Undoubtedly had Ross wished it he would have had the appointment, and his name was freely referred to in the newspapers of the time as the one man for the post; but he declined it in advance, though tempted by the offer of a baronetcy and a good-service pension if he would consent to go. It has been said that an agreement with his wife's family when he was married in 1843 prevented him from taking the command. In any case the southern voyage had been far more trying to the captain than to the crews, and the wear and tear of the ceaseless responsibility and anxiety made a prolonged rest desirable.

Sir John Franklin had been recalled from his Governorship of Tasmania in a manner which incensed him deeply and made him at the age of fifty-nine nervously anxious to prove by some new achievement in his old field of Arctic exploration that he was indeed worthy of the confidence in which he was held by the public and by all departments of the Government except the Colonial Office. No one can doubt now, and probably no one who knew the facts of polar climate doubted then, that the willing spirit of Franklin caused him to underestimate the weakness of the flesh. The polar regions are fitted only for the efforts of young men in the zenith of their strength, the only possible exceptions being tough old whalers who have never had time to be softened by so much as a summer at home, and the fitness of whose selection is attested by the fewness of their contemporaries. Frank-

lin was not a man of this kind; but he was determined to go. The nation admired his pluck with the generous impulse that prompts admiration of any action in which the means seem inadequate to the end in view; the Admiralty and his personal friends recognised that his acceptance of the command would heal a painful wound and satisfy the feeling dear to the official mind that seniority is the highest claim to employment. Moreover the Council of the Royal Society had sent a strong recommendation of Franklin as the best possible commander of the new expedition, and that of itself would probably have decided the Government in the matter.

The Erebus and Terror were overhauled, and to inaugurate the new era then dawning in the control of the sea they were fitted with auxiliary engines and screw propellers, being thus the first steam vessels to meet the polar ice. They sailed from England almost simultaneously with the return of the Pagoda to the Cape of Good Hope. Captain Crozier was in command of the Terror as he had been under Ross in the Antarctic voyage; the popular hero Sir John Franklin commanded the Erebus and the expedition. On July 26, 1845, the old Antarctic ships were spoken by a whaler in Davis Strait and reported that both crews were all well and in remarkable spirits; then the curtain fell.

This is not the place to repeat the oft-told tale of the long absence of news, the growing anxiety of friends at home, the lavish efforts of the Admiralty to obtain information by means of naval expeditions which were singularly though perhaps not inexplicably unfortunate, or of the magnificent perseverance of Lady Franklin, and the final discovery of authentic records by Sir Leopold McClintock during a private voyage in the little Fox. It

334 SIEGE OF THE SOUTH POLE

is enough to say that the halo of romance thrown round the Arctic regions by Franklin's fate and his wife's devotion turned the eyes of the few among the public who cared for these things from the more sombre south. All polar exploration and polar research clung round the nearer problem of the north, and the south was all but forgotten. The fascination of the valueless North-West and North-East Passages had kept the world's attention for centuries while all the time the whole volume of trade flowed in the South-East and South-West Passages by the Capes of Good Hope and Horn through the all but unknown Southern Ocean where no exploring ship was destined to sail again for yet thirty years.

All the same there were not wanting men who, concerning themselves with the phenomena of nature and the safety of sailors rather than the emotions of the general public, saw the immense importance of increasing our fragmentary knowledge of the remotest south. First amongst these stands Matthew Fontaine Maury, an officer of the United States Navy, a profound scientific investigator, and the most brilliant writer who ever attempted to put into words the wonders of the sea as they are revealed to an appreciative mind by the patient study of facts. Maury's "Physical Geography of the Sea" is so full of charm, so permeated by his own enthusiasm that even now, after the data have been corrected almost beyond recognition by subsequent research, and the theories shown to be fallacious or imperfect, the book remains the most popular treatise on the oceans. As Superintendent of the United States Hydrographic Office Maury did much to improve the science of navigation and the study of oceanic and atmospheric phenomena not in his own country only but throughout the world. His

name was honoured in every Admiralty, he corresponded on terms of cordiality with emperors and princes; scientific institutions in almost every country showered their honours upon him, though it is curious to note in the list of these distinctions that the British Empire is represented by the University of Cambridge alone.

In the middle of the nineteenth century steamers were so far perfected as to begin to come into rivalry with sailing ships as cargo-boats; but they were still so slow and their coal-endurance so limited that a well-found clipper, commanded by a thoroughly trained navigator possessed of a sound knowledge of winds and currents could still beat them on long voyages. Every improvement in the science of ocean meteorology gave the sailing ship a fresh advantage and prolonged the struggle for supremacy on the sea with the growing power of steam. Thanks to Maury's teaching American merchant captains were the first to adopt the shortest or great-circle route on their voyages round the Cape of Good Hope and Australia to China, and back by Cape Horn. In doing so they necessarily reached high southern latitudes. The common use of maps on Mercator's projection makes it difficult for the ordinary reader to understand how the shortest track from the Cape of Good Hope to New Zealand can possibly lead a vessel south of the Antarctic circle. The full explanation in words would fill several pages and form a wearisome digression, but a piece of thread stretched tight from Cape Town to Dunedin on a common school globe will prove in half a minute that the fact is beyond controversy. One of the American ships, inspired by Maury, discovered Heard Island south of Kerguelen while pursuing such a course. A British ship making a similar course lit on McDonald Island

336 SIEGE OF THE SOUTH POLE

close to the same position, and the islands were independently discovered more than once before they appeared on the chart. Many vessels encountered great danger from the floating ice and the contrary winds experienced south of 60° S., and it was found before long that the quickest passage was not to be made by the shortest route. Ships now take a composite course, finding it more economical to sail a longer distance in the clear seas and favourable winds between 40° and 50° S. than to run the risk of long nights, floating ice and contrary winds that beset the shortest track.

While these things were being discovered Maury felt the need for a more detailed knowledge of the Antarctic seas and especially of Antarctic weather, so that the sailing directions could be amplified and corrected, and he gradually came to the conclusion that the time was ripe for the resumption of Antarctic exploration. He had been successful in securing international coöperation in the study of maritime meteorology and knowing what could be done by voluntary association he felt that the exploration of the Antarctic was too great a work for any nation to undertake single-handed, though this also he attempted to bring about. In the winter of 1860 he visited England and read a paper to the Royal Geographical Society on the Physical Geography of the Sea in connection with an Antarctic Expedition. He urged that the Admiralty should take the matter up in the interests of navigation. Many comfortable words were spoken in the discussion which followed. Captain Maury was assured of the high esteem in which he was held, he was reminded of the immense services he had rendered to all seafarers, and the President said that a British expedition towards the South Pole would be "as much

for the general benefit of mankind as it was for the glory of this country;" but nothing followed.

Maury next sent a letter appealing for consideration to the Ministers of all the chief Powers at Washington, and the letter addressed to Lord Lyons was transmitted by him to the Foreign Office who referred it to the Admiralty, and the Admiralty sent it to the Secretary of the British Association by whom it was put before the Department of Meteorology at the Manchester meeting in 1861. The letter set forth reasons for believing that though the summer in the Antarctic region was colder than that in the Arctic the winter would probably be milder in the south than in the north. Accordingly Maury suggested that an expedition should be dispatched with a base in Australia to search for a safe harbour in which one or two vessels to be sent south the following year could winter for two or three seasons, with relief provided each year from the base. His arguments did not lack force or eloquence. After referring to the expeditions of D'Urville, Ross and Wilkes (he used the alphabetic order) Maury proceeded:

"But since that time the world has grown in knowledge, and man has gained wonderfully in his power for conquest in this field of research. We have now the steamer, which former Arctic Explorers had not; the experience acquired since their day, in polar exploration about the Arctic regions, enables us to overcome many an obstacle that loomed up before them in truly formidable proportions. The gold of Australia has built up among the Antipodes of Europe one of the most extensive shipping ports in the world. By steam, it is within less than a week's sailing distance of the Antarctic Circle; and thus those unknown regions of the south

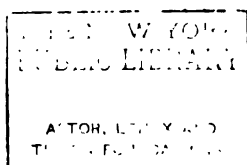
338 SIEGE OF THE SOUTH POLE

instead of being far remote, as in the time of all previous explorers they were, have, since exploration was last attempted there, been actually brought within a few days' sail of a great commercial mart, with its stores, its supplies, and resources of all kinds. The advantages and facilities for Antarctic exploration are inconceivably greater now than in the days of Cook and others. They are greatly enhanced by the joint system of national co-operation for the purpose of searching out the mysteries of the sea, now recognised and practised by all maritime nations. In this beautiful and beneficial coöperation, officers of the different nations have learned to pull and work together for a common good and a common glory. This habit would be carried to the South Pole by co-operation among the different nations concerned in sending out vessels for exploration there. Nay, that great unexplored area lies at the very doors of one of the Powers that is most renowned in this field of discovery."

But the words were wasted. The British Association took no action, and we do not know what reply was sent to Washington. Probably there was no reply, for months before the letter had passed through diplomatic channels to repose in the quiet haven of the archives of the Parliament of Science, Maury had resigned his commission as Superintendent of the United States Hydrographic Department and thrown in his lot with the Southern States. Those who knew the intensity of his devotion to the work of his office and who understood the unique position he occupied as the centre of the world's maritime research could alone estimate the strength of that sense of duty to his native State which tore him away from all else he cared for. In the great convul-



His Excellency Geheimrath Prof. Dr. Georg von Neumayer.



sion which shook America the plans for an expedition to the South Pole fell unheeded to the ground. The Civil War broke up the small band of Americans interested in such matters. Wilkes and Maury found themselves no longer brothers-in-arms but fighting against each other, the former afloat in the United States Navy, the latter organising the defence of the Confederate shores.

The life of His Excellency Professor Georg von Neumayer, a disciple of Maury's, exhibits an extraordinary pertinacity in the advocacy of the renewal of Antarctic work for more than half a century. If there be any truth in the saying:

"Tis not what Man Does that exalts him,
But what Man Would do."

Neumayer should take one of the highest places amongst those who strove to unbar the gates of the South, and if the name of a cherished locality is ever engraved by the earnest thought of years upon a human heart Dr. von Neumayer's is surely marked broad with the word *Südpol*.

On taking his degree in 1849, Georg Neumayer's mind was full of the exploring voyages of Ross, Wilkes, and Dumont D'Urville, and the scientific deductions of Gauss and Sabine. Resolved to pursue his studies in terrestrial magnetism and in the science of the ocean, and not without the ambition of aiding a United Germany to arise and grow into a maritime Power, he made a voyage to South America in a Hamburg ship in order to acquire a practical knowledge of nautical astronomy and navigation. On his return he passed his examination as Mate, and spent several months in the effort to obtain a post in the Austrian Navy, Austria being then the most

340 SIEGE OF THE SOUTH POLE

powerful maritime State of the German Confederation. Failing in this, he gave a series of lectures in Hamburg on Maury's theories of the ocean and on the recent improvements in the science of navigation; and since he could find no other way of gratifying his craving to see the southern hemisphere, he shipped as a common sailor and landed at Port Jackson in Australia in 1852. He spent two years in the Australian Colonies, part of the time as a gold digger at Bendigo, and, when the digging was unfortunate, as a lecturer on navigation in a tent to audiences of sailors disappointed in the quest of gold. In 1854 he returned to Europe on a sailing ship with a mutinous crew, and he came back resolved to leave no stone unturned to get up a voyage of scientific exploration toward the South Pole, or a journey into the then unknown interior of Australia.

Neumayer was fortunate in making the acquaintance of Alexander von Humboldt, the chief mover as we have seen, in the revival of Antarctic exploration twenty years previously, and he also met Dove, the meteorologist, and the great chemist, Liebig. King Maximilian II of Bavaria, an enlightened patron of science, who consulted Liebig as his chief scientific counsellor, considered a memorial drawn up by Neumayer on the important results bearing on Antarctic research which would accrue from the study of terrestrial magnetism at Melbourne, and granted the funds for establishing the well-known Flagstaff Observatory. In August, 1856, before leaving for Melbourne to take up this work, Neumayer laid his plans for a physical observatory before the British Association at Cheltenham, and received the approval of Whewell, Airy and Faraday.

While carrying on the magnetic and meteorological

observations at the Flagstaff Observatory, and collecting on Maury's plan all possible data as to the navigation of the Southern Ocean, Dr. Neumayer took a prominent part on the Committee which directed the exploration of the interior of Australia; but in 1862 he once more returned to his favourite subject of Antarctic research. In a farewell address to his countrymen at Melbourne as he was leaving for Europe he said:

"It would be a glorious moment in the next period of my career if I could seek the Antarctic regions in a German ship, and perhaps sometime you will see me return to these shores accompanied by the pick of the youth of all German races, bound on a voyage to the South Pole."

So far did the coming of the Gauss cast its shadow before.

Dr. Neumayer urged the practical side of Antarctic research; he showed how it would increase the certainty of navigation, and how it would stimulate the spirit of maritime enterprise which, from his student days, he had recognised as an indispensable element of national greatness. Thus he took as the theme of his first serious appeal on returning to his fatherland, at Frankfort in 1865, the importance of Antarctic exploration and the necessity for the foundation of a central institution for the systematic study of oceanography and marine meteorology. The latter suggestion was acted on in a liberal spirit, and in his direction of the Deutsche Seewarte at Hamburg, Dr. von Neumayer has fulfilled his life-work and placed his country in possession of an oceanographical institution of which Maury himself would have been proud, and which is the admiration, if not the envy, of the oceanographers of other countries. Not only has it proved of inestimable practical value to the seafarer, but

342 SIEGE OF THE SOUTH POLE

it has afforded training to a number of scientific men whose names, already well known, are destined to occupy a high place on the roll of students of nature.

The other design was not accomplished; the prophet of the Antarctic was never to enter his land of promise. Dr. Neumayer suggested that an expedition for Antarctic research should be fitted out as a preliminary to the Transit of Venus Expedition in 1874. The Vienna Academy of Sciences took the matter up cordially on the advice of Admiral Tegetthoff, and Dr. Neumayer was promised the command of an expedition to set out from Hamburg towards the end of 1870. The outbreak of the Franco-Prussian War and the birth of the German Empire interrupted the expedition, but Admiral Tegetthoff revived it in the following year, and all was going well when the sudden death of the Admiral brought the plan to an untimely end. So Austria-Hungary lost the honour of renewing South Polar research, and Dr. Neumayer the opportunity of becoming an explorer.

War and death—the catastrophes of nations and of men—broke the smooth run of the thread of our history not once but many times. Yet, after each check, another voice was raised in support of a renewal of Antarctic research. The Astronomer Royal, Sir G. B. Airy, had pointed out the desirability of securing a station for observing the transits of Venus of 1874 and 1882 south of the Antarctic Circle and somewhere near the meridian of 105° E., and the general voice of Arctic navigators was in favour of this being done by dispatching a preliminary expedition to find a suitable spot. Staff Commander J. E. Davis, formerly Second Master on the *Terror*, whose vivid description of the collision with the *Erebus* was quoted in an earlier chapter, read a paper to

the Royal Geographical Society early in 1869 "On Antarctic Discovery and its connection with the Transit of Venus in 1882." He pointed out that while the names of the Arctic discoverers were familiar to all, scarcely anyone knew those of the heroes of the Antarctic, and but for the approaching transits of Venus which could best be observed in high southern latitudes he believed the Antarctic might remain neglected for another century. Davis suggested that as the weather in the Antarctic regions when fine was so gloriously clear it would be worth while to arrange for an expedition to go out in the southern summer of 1881-82, if not in 1873, to Victoria Land and try to establish an observing station on Coulman Island, or failing that on Possession Island where a landing could certainly be effected. There was a discussion in which the Arctic officers who had supported Airy's suggestion of the year before reiterated their views, but nothing came of the proposal beyond kindly expressions and congratulations on the previous services of the pleader. The transit of Venus, though not neglected by astronomers, had no longer the power to stimulate exploration in the way it had done when Cook set out on his first voyage of circumnavigation. The opportunity was lost. From what quarter the first throb of steam power came to the Antarctic seas will appear in the next chapter.

CHAPTER XVII

THE CHALLENGER

"Fair beams the torch of science in thine hand,
And sheds its brightness o'er the glimmering land."

—E. B. BROWNING.

ARISTOTLE is said to have been the first marine biologist, at any rate he described a great number of the denizens of the Ægean waters, and the lantern-like dental apparatus of the sea-urchin is called Aristotle's Lantern to this day. Far back as the time is when Aristotle studied the sea-creatures of the Greek Archipelago, we have to go all that way if we wish to trace to its origin the line of thought which first brought steam to the Antarctic.

When the study of marine zoölogy began to revive in modern times the domain of the naturalist was for centuries restricted to the shore between tide marks, unless when rare occasions served and he was young and bold, he voyaged with the fishing boats and made great booty of their "rubbish." With the exception of some shark fishers off the coast of Portugal who brought up by their deep-sea lines some siliceous sponges rivalling in beauty the "Venus's flower basket," even the adventurers in boats were limited to shallow waters near the shore.

After the naturalist borrowed and adapted the implements of the oyster dredger and the trawler he still fixed his attention on shallow water, collecting mainly within what he knew as the littoral zone. He ascertained that

as the depth increased the wealth of animal life diminished rapidly; and at the time in the "forties" and "fifties" of last century when the records of the British Association bristle with Committees to promote the exploration of the British Seas by means of the dredge, that attractive expression "the bathymetric zero of life" figured not infrequently on scientific pages. There was some reason for it, as there is for most attractive errors. In the Black Sea for instance, death reigns below the depth of a few hundred fathoms, and the mud at the bottom is putrid, exhaling sulphuretted hydrogen. Moreover it had been supposed in the beginning of the nineteenth century that the temperature of the sea, diminishing rapidly, as it was known to do, must fall so low in great depths as to leave the bottom covered with eternal ice. Observations carried out with faulty thermometers led later explorers to the equally false and much less logical conclusion that the great mass of the ocean below the upper skin of warm or cold water had a uniform temperature of 39° F. right down to the bottom. This delusion may possibly have originated in some person, whose opinion carried too much weight to be lightly questioned, forgetting or never learning that on being cooled down, salt water, unlike fresh water, does not attain its maximum density some degrees above the freezing point. Be that as it may, the construction of thermometers adequately protected against the enormous pressure of great depths set the error right soon after the discovery was made that long submarine cables could be used for transmitting telegraphic messages across the oceans.

The contour of the bed of the North Atlantic was soon felt out by lines of close and accurate soundings. Cables that had been deposited for some years in very deep

346 SIEGE OF THE SOUTH POLE

water were hauled up for repairs and found to be crusted with living shells. Then the authorities concerned with the study of marine life remembered a number of confirmatory instances, how old Sir John Ross had got up sundry curious creatures from the mud at a great depth in the Arctic regions in 1818, and his nephew Sir James Clark Ross using the same "deep-sea clamms" had secured very similar creatures in the equally deep water of the Antarctic seas more than twenty years later; and it was recognised that after all there might be no zero of life. Indeed so far did the pendulum swing that while the researches were still in their infancy learned biologists thought and even spoke of the whole floor of the ocean, down to the depths of the profoundest abysses, being clothed with a sheet of living protoplasm. No grander idea ever entered the human mind; it was the girdler snake of the Northern Mythology revived and extended into an all-embracing, pulsating being, without beginning or end. One could picture the edges of this living sheet as it approached the shore-line breaking up into protozoa which as the ages ran on developed into every organism, so that the whole range of organic evolution could be traced by descending into the depths of the sea. *Bathybius haeckelii* was the name of this hypothetical primordial being which figured but for a little while upon the stage of the microscope, and was relegated by later research to the limbo of the kraken and the roc.

Dr. W. B. Carpenter from the time when he wrote his thesis for the degree of M. D. on the Nervous System of Invertebrate Animals in 1839 took the keenest interest in the life of the sea. Not content with shallow water dredging, and convinced of the value of deep-sea research in its bearings on the science of life, he induced the

Royal Society to apply to Government again and again for the use of naval vessels to investigate these matters, and as a result he made observations from the Shearwater in the Mediterranean in 1866, and secured expeditions in the Porcupine to the Bay of Biscay in 1868, and in the Lightning to the North Atlantic in 1869 under Professor Wyville Thomson. The experience of each cruise increased the ease of using the deep-sea dredge and trawl, and produced fresh evidence as to the abundance of life at the greatest depths, the variety and importance of the distribution of temperature and the interest attaching to the deposits of the deep sea.

The various instruments used in deep-sea work were rapidly improved, especially the sounding-leads which were loaded with heavy sinkers that became detached automatically when they struck the bottom, remaining behind and leaving only a light brass tube to be hauled up with a sample of the deposit contained in it.

The results of the various short summer cruises were sufficient to show that if an expedition could be fitted out for the special purpose of research in marine physics, chemistry and biology with all the seas of the world as its field of work, an immense increase in knowledge would be the result. The Hydrographer to the Admiralty, Admiral Sir George Richards, indicated to the Council of the Royal Society that such an expedition might be fitted out if sufficient reason were produced by the Society; and the lines he suggested were adopted in approaching the Government. The Treasury came to the wise decision that money spent on such a voyage would not be wasted, and the right moment in the history of science was for once seized in the right way. The Government could hardly have been aware at the time of the

348 SIEGE OF THE SOUTH POLE

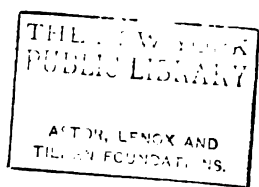
magnitude of the work, and certainly could not have foreseen the immense prestige which that decision was to secure to the British name amongst the intellectual of all countries; but the work once undertaken was carried out in the most generous and ample spirit.

The field of the expedition was so enormous that the chief difficulty in planning it lay in finding parts of the world to exclude, rather than parts to include within its scope. It was felt from the beginning that whatever might be left out the border of the Antarctic regions must not be neglected, though a vessel adapted for exploration in the ice would have been totally unsuited for the long sojourns that were contemplated in tropical waters. The promoters of the deep-sea expedition kept a double end in view. They wished to secure a physical as well as a biological survey of all the oceans. The objects of special study were to be the depth and configuration of the bed of the oceans, the nature, origin and distribution of the deposits resting upon it, the chemical composition, salinity, temperature and movements of the water from the surface to the bottom, and finally the distribution of organic life throughout all depths and in every accessible latitude and longitude. As to latitude the Arctic regions were left out of account for the time, but the Southern Ocean was to be explored "as far as the neighbourhood of the great Ice Barrier."

The Admiralty assigned to the service H. M. S. Challenger a roomy wooden corvette of 2306 tons, provided with auxiliary steam power. She was not fortified for ice navigation, but was thoroughly sound, and even without steam she was, except for her size, probably better fitted for an Antarctic voyage than any of the ships of Bellingshausen, Wilkes or D'Urville. The



Sir John Murray, K.C.B., of the Challenger.
(Photograph by Messrs. Thomson, London.)



Admiralty placed her under the command of Captain George S. Nares, R.N., and the Royal Society nominated a civilian scientific staff under the direction of Professor C. Wyville Thomson, of Edinburgh. The captain and the professor shared the same day cabin, and their sleeping cabins were in positions of equal dignity and advantage. While the captain was of course the absolute master of the ship and crew, he was instructed to communicate freely with the director on all matters touching the scientific work of the expedition. Part of that work was confided to the naval officers who undertook the whole of the magnetic and meteorological observations. The civilian staff, who were of course "expected to conform" to the usages of a ship of war, included Mr. J. J. Wild, the Artist and Secretary to the Director, Mr. H. N. Moseley of Oxford and Mr. John Murray as biologists, and also Dr. von Willemoes Suhm, who died on the voyage; Mr. J. Y. Buchanan was charged with the chemical, physical and geological work.

The Circumnavigation Committee of the Royal Society drew up a scheme for the track of the exploring ship across the oceans, one portion of which may be quoted as showing to what extent the Challenger was intended to undertake Antarctic exploration. The route after leading to the Cape of Good Hope was to proceed:

"Thence by the Marion Islands, the Crozets, and Kerguelen Land to Australia and New Zealand, going southward *en route* opposite the centre of the Indian Ocean, as near as may be with convenience and safety, to the southern Ice Barrier."

This was in order to investigate the especially interesting fauna of the Antarctic seas regarding which the Committee said:

350 SIEGE OF THE SOUTH POLE

“Probably investigations in those latitudes may be difficult; it must be remembered however that the marine fauna of those regions is nearly unknown, that it must bear a most interesting relation to the fauna of high northern latitudes, that the region is inaccessible except under such circumstances as the present, and that every addition to our knowledge of it will be of value.”

One more quotation may be allowed, this time from the detailed instructions given to Captain Nares in 1872 by the Admiralty, where, after telling him when on his way from Kerguelen to Australia to “look at” Heard or McDonald Island and then strike southward in the neighborhood of 90° E., he is informed that:

“Captain Moore reached to the parallel of 65° in this meridian in 1845 and observed the appearance of land to the westward. It is not desirable however that you should pursue any extended hydrographical exploration in this region with a single unfortified ship.”

The Challenger sailed on 21st December, 1872, pursuing her course across the North Atlantic and back again several times, calling at most of the island groups on the way and gaining experience in the use of deep-sea instruments by the usual unroyal road. Then she crossed the South Atlantic to Bahia and at length reached the Cape of Good Hope on October 28th, 1873. After an interval for rest and refitting the Challenger sailed from Simon's Bay on December 17th, for the portion of her voyage to which the early part of this chapter has been introductory. It was scarcely an Antarctic expedition, yet more real knowledge of the nature of the Antarctic regions was obtained in the course of it than in any other voyage up to that time, Ross's excepted. This was not because the ship went far, but because the opportunities

which presented themselves were used to the full at the time and discussed in the completest way possible afterwards.

The ship stopped at Prince Edward and Marion Islands and made a landing. There the naturalists observed for the first, and as it happened the only time during the cruise, the curious pouch-like arrangement of the skin on which the penguins carry their eggs or young, a feature which had led a mariner shipwrecked on the Crozets forty years before to compare the penguins to kangaroos. The next land to be explored was in the Crozets, but after bringing in the New Year, 1874, dodging about in the fog off the inhospitable shores and vainly trying to find a sheltered landing, the attempt was abandoned. The ship pursued her way to Kerguelen Land running before a strong northwesterly wind which raised too much sea to allow of soundings being taken. On January 7th the Challenger anchored in Christmas Harbour, Kerguelen Land. Here a good deal of surveying was done, and three weeks spent in the harbour or cruising along the coast, for Captain Nares was charged with the selection of a suitable site for observing the transits of Venus in 1874 and 1882.

The naturalists had a busy time in studying the fauna and flora of the island, while the officers whose tastes lay more in the direction of sport than science were no less absorbed by the ducks, penguins, and seals which abounded. American sealers were met at Kerguelen, where they still continued to work, whaling also in the neighbouring seas. One party stayed on Heard Island while the main body cruised from Kerguelen in small vessels, a larger ship communicating once a year with a Connecticut port. The importance of the whale fishery

352 SIEGE OF THE SOUTH POLE

and seal hunting carried on from this outpost of the Antarctic had dwindled greatly from what it was when Ross paid his visit thirty years before.

On February 1st the Challenger left Kerguelen and four days later passed McDonald Island and reached Heard Island where Captain Nares landed, accompanied by Messrs. Buchanan and Moseley. They were greeted by a group of amazed sealers with the words, "Guess you're out of your reckoning," for these men could not imagine any motive but the search for seals to bring a ship to such a remote and uninviting spot of land, and the Challenger was obviously no sealer. A dismal enough life the forty seal hunters led, housed in huts half excavated in the ground so as to be easily covered with snow for warmth in winter, and scattered in groups along the coast seldom communicating with each other. Part of their work consisted in watching the landing of the seals and driving them back to sea with whips made of sea-leopard skin when they tried to come ashore on beaches which could not be approached by the schooners on their annual visit. The rest consisted in killing the poor beasts when they landed at last in places where the skins and blubber could be readily shipped. The glaciers creeping from the central mountain cut off the different segments of the island from one another and made them very difficult of access. The attempt to travel on the beach round the coast was even more hazardous than braving the crevasses and the fog on the glaciers of the higher slopes. The weather was so bad that the Challenger could not survey the island, and it remains to this day uncharted save for the rough sketches made by the sealers. They, too, have now deserted it after killing off the seals, and ships, as we have seen, no longer enter upon those seas unless driven

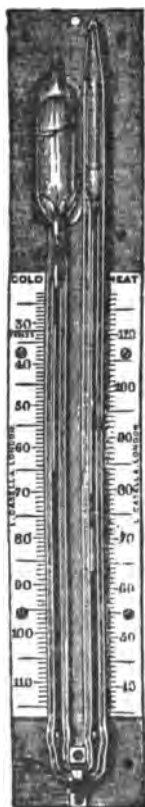
far out of their course, so that the veil once lifted has dropped again, and Heard Island has drifted back into the unknown.

On February 8th, 1874, the Challenger resumed her course southward on the meridian of 80° E. and fared no better, though no worse, in the way of weather than did her predecessors in the same seas. The first iceberg was seen on the 11th in 61° S., a beautiful flat-topped mass 700 yards in length, floating with more than 200 feet above water. For some days the weather improved, and only a few icebergs were in sight at a time, though these were of exquisite beauty, especially on account of their deep azure colouring. It was found necessary to lay-to during the few hours of darkness, in order to reduce the risk of collision with floating ice, and as fogs were frequent and the coal supply was not so ample as to encourage the use of steam when sails would serve, the day's runs were often very small.

On the 15th a good deal of ice was visible, the edge of the pack being in sight to the southeast. A sounding was made in $65^{\circ} 42'$ S., $79^{\circ} 49'$ E., where a depth of 1675 fathoms was found. Temperature observations were made as usual at frequent intervals of depth, but the thermometers which had given excellent results in tropical and temperate seas now found themselves in the presence of conditions with which they could not cope. The deep-sea thermometer used by the Challenger was known as the Miller-Casella, a modification of the familiar Sixe's form. A steel index in one limb of a tube bent into the shape of the letter U was left at a point indicating the highest temperature the thermometer had passed through, and a similar index in the other limb was left at a point indicating the lowest temperature to which the

354 SIEGE OF THE SOUTH POLE

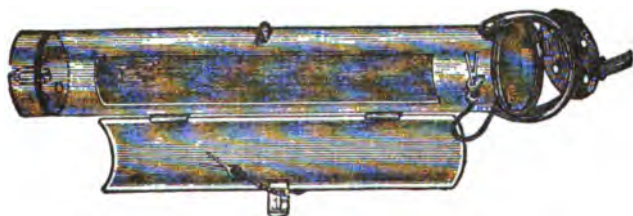
instrument had been subjected. Before the thermometers were lowered into the water the two indexes were set by



THE MILLER-CASELLA DEEP-
SEA THERMOMETER.

means of a magnet so that both indicated the temperature at that moment. Hitherto the surface water had been the warmest and so when the thermometer returned

to the surface the index on the maximum side had not moved, while that on the minimum side showed in every case the temperature at the deepest point to which it had been sunk, the temperature falling as the depth increased. But now on account of the enormous masses of ice beneath the surface the coldest layer of water was not at the bottom, and the thermometers from all depths below the zone of lowest temperature showed merely the temperature of that zone and gave no information as to what the condition of things might be beneath it. After some experimenting it was found possible, by cooling the thermometers down to the temperature of melting sea-ice before setting the indexes, to utilise the maximum side for reading the temperature below the cold zone and thus it was ascertained that in the depths of the Antarctic Sea there were layers of water of higher and lower temperature sandwiched one above another. Since the



OUTER CASE OF MILLER-CASELLA
DEEP-SEA THERMOMETER.

cruise of the Challenger deep-sea thermometers on an entirely different principle have been perfected, making it possible to ascertain the exact temperature at any point of depth.

The interest of these observations does not lie in the gratification of an idle curiosity as to how warm or cold

356 SIEGE OF THE SOUTH POLE

it is down there, but in the evidence which is afforded as to the movement of the water, the effects of which are made apparent not in the sea alone but in the air and in the weather of all parts of the Earth's surface. This observing station was peculiarly interesting for it was the point nearest to the South Pole at which the conditions of the deep ocean had been observed and the forms of life dwelling on the sea-bed collected. When the dredge was hauled the ship proceeded along the edge of the pack westward in the hope of getting into a clearer sea.

On the 16th the weather was remarkably clear, and from the masthead the ice seemed to form a continuous barrier, though on steaming toward it the apparently smooth wall was found to consist of numerous separate bergs, all about 200 feet high, and some of them as much as four miles in length. For a time Nares hoped to be able to make a landing on the ice for magnetic observations; but the smaller pieces were rising and falling with the swell so as to be useless for the purpose, while the steep sides of the larger ice-islands made their flat tops quite inaccessible.

At 2.30 p. m. on 16th February, 1874, the position of $66^{\circ} 40'$ S. was reached, 8 miles within the Antarctic circle, in $78^{\circ} 22'$ E. No pack ice was then in sight and a clear sky to the southward promised well for an attempt to reach higher latitudes. It was evident that the pack seen on previous days was only a detached floe. Penguins and whales were in sight and many pieces of broken ice. It was not however the intention to make a high latitude or to push southward until the way was blocked by ice, and the Challenger turned, content with having been the first steam vessel to touch and cross the magic circle of the south.

A good deal of disappointment was felt on board that no new land was sighted, and that the great ice-barrier believed to lie not far within the pack was not even seen. However something definite was done, and the reports of extremely abundant whales in these seas was confirmed, though as there were no practical whalers on board the commercial value of the cetaceans seen could not be positively known.

The serious work of the Challenger lay eastward along the margin of the floating pack where three more soundings and dredgings in from 1300 to 1975 fathoms were made south of 60° S. All were extremely rich in living forms of every kind possible in the deep sea, in fact the hauls teemed with life more than in any of the other dredging stations of the whole world-wide cruise. The usual easterly wind proved troublesome as the ship was attempting to make her way towards the "Termination Land" doubtfully reported by Wilkes. Many observations of the icebergs were made, one berg was bombarded with a twelve-pounder to test the quality of the ice, and, what is much more important, the bergs were photographed for the first time and interesting water-colour paintings made to put on record their wonderful depth and richness of colour.

On February 23rd the ship was stopped by the pack in 64° 18' S., 94° 47' E., only 20 miles east of the assumed position of Termination Land, of which nothing was seen though the horizon was clear. A sounding in 1300 fathoms was obtained at this point. Next day a serious accident was narrowly averted as described without emotion in the official Narrative:

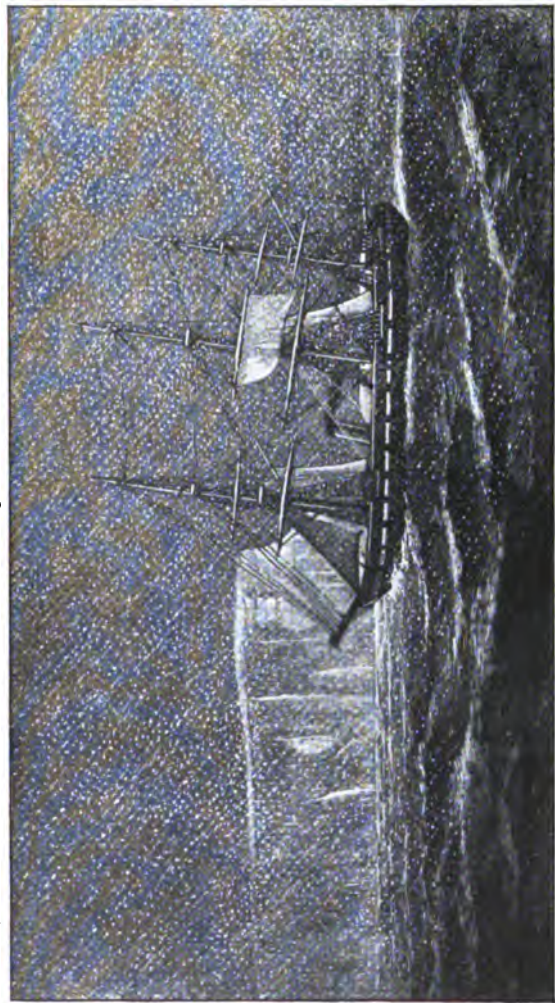
"At this time the weather looked very threatening, and snow began to fall, so the ship steamed under the lee of a

358 SIEGE OF THE SOUTH POLE

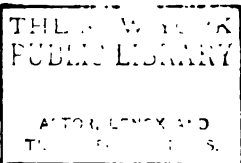
berg and the top-sails were close reefed. Whilst keeping head to wind under the berg, steaming slowly, a sudden lull for a minute, by removing the force against which the screw was acting, caused the ship to gather headway, and before the engines could be stopped the vessel ran into the berg and carried away the jib-boom, martingale, and one of the whiskers. The ship was backed astern clear of the berg, and having finished reefing, and furled the top-sails, laid-to under fore and aft sails on the port tack to get in the wreck of the jib-boom. The weather continued to get gradually worse and the heavy snow-fall obscuring the view, rendered the position an anxious one."

In his racy "Log Letters from the Challenger," Lord George Campbell, who was one of the officers, gives a more animated account of the circumstances following the loss of the jib-boom, though no less permeated by technicalities and not to be understood without some vague doubts by land-lubbers:

"We drifted on all forenoon, seeing no bergs through the fog and blinding showers of snow though we knew that they were close around somewhere. In the meantime we were hard at work getting in the wreck of the head gear—no easy work in the intense cold and violent wind—when suddenly, at three o'clock, in the middle of a tremendous thick squall, comes the hail from the fore-castle, 'Iceberg close to under the lee bow, Sir!' There is no room to steam ahead, so 'full speed astern!' Rattle, rattle, goes the screw, sixty revolutions a minute; 'Clear lower deck, make sail!' shriek the boatswain's mates; on deck flies everybody; 'Maintopmen aloft; loose the maintopsail!' 'Forepart, take in the fore try-sail!' The Captain and Commander howling out orders from the bridge, hardly heard in the roaring of the wind; officers repeat-



H.M.S. Challenger after Collision with an Iceberg.
(From the Challenger Narrative.)



ing the howls. The weather-clew of the maintopsail is set aback, the headsails taken in, slowly she gathers stern way, keeping her head turning slightly towards the berg, a towering, dim white mass looming grimly through the driving snow, and then she clears it—a narrow shave! The violence of the wind prevented us then from making a friend of our enemy by keeping under its lee, so the ship was again allowed to drift on, amid dense fog and snow, till five o'clock, when another iceberg was seen at a little distance ahead, to leeward of which we drifted, where the wind being broken, the ship's head was turned by means of steam and sail, and all night long we kept dodging backwards and forwards between these two bergs, where we knew the sea to be clear of dangers. In the evening the weather became clearer, though it still blew hard; deck covered with slush ice. Anxious work enough for the officers of watches and the Captain, who was on deck for I don't know how many continuous hours."

Released from this peril the Challenger pushed a couple of miles into the pack until she was only about fifteen miles from the position of Termination Land as charted. Seeing nothing of it she turned and steered a northeasterly course and passed the parallel of 60° northward on the meridian of 99° E. on February 28th, having been south of it for 18 days during which the ship sailed over 22 degrees of longitude. On March 17th she arrived at Melbourne and the Antarctic part of the voyage was over.

The actual exploration amongst the ice on the surface was so little that on a superficial view it would seem absurd to devote a chapter to it; but the study of the surface fauna and flora and of the half dozen deep soundings made during that time revealed a wealth of new information. A good deal of the biological work would have been

360 SIEGE OF THE SOUTH POLE

anticipated by Sir James Ross had the collection brought home by that explorer been fully worked up, and it is the completeness with which every scrap of physical and biological information obtained by the Challenger was subsequently analysed and made use of which chiefly distinguishes the expedition from all that went before.

With regard to one of the specific problems prescribed before the Challenger sailed, Sir John Murray pointed out, that no fewer than ninety species of animals known in the northern seas were also found living south of Kerguelen, but had never been reported from any part of the tropical seas that lie between the two polar regions. For the rest, the study of the deposits showed conclusively that the Antarctic continent exists and though, as Cook asserted, it is eternally frost-bound it is a real continent the rocks of which carried northward by the icebergs and dropped on the floor of the ocean are of a kind only found on continental land. The glaciated rock fragments dredged by the Challenger which clearly proved that continental land existed within the ice-bound region of the Antarctic were gneisses, granites, mica-schists, grained quartzites, sandstones, compact limestones, and shales, none of which occur in any oceanic island. This is the discovery which gives to the voyage of the Challenger its chief geographical importance, and it shows how unexpected are the lights which scientific research is always throwing on questions that seem at first sight very remote. It would be interesting to conjure up the flood of indignant yet dignified eloquence with which old Dalrymple would have overwhelmed anyone who dared to make the "illiberal imputation" that his great Southern Continent was to be discovered by the aid of a microscope in the mud from a sounding lead!

The Challenger left the Antarctic question in this position: there is undoubtedly a continent within the Antarctic circle covered for the most part with an immensely thick coating of ice. Sir John Murray, taking account of every indication, drew a hypothetical outline of that continent which subsequent discovery has not as yet materially modified. More than this, the study of the Challenger's meteorological investigations indicated, as was clearly shown by Sir John Murray and Dr. A. Buchan, that an area of permanently high atmospheric pressure lies over the ice-bound continent around the South Pole.

We have seen how the researches of the mathematician Gauss in terrestrial magnetism led directly to the great Antarctic expeditions at the dawn of the Victorian era. It is not too much to say that the work of the Challenger and the discussions of that work by various men of science, brought about the still greater expeditions of the beginning of the twentieth century.

CHAPTER XVIII

STEAM WHALERS BOUND SOUTH

"The bergs like kelpies overside that girn and turn and shift
Whaur, grindin' like the Mills o' God, goes by the big South
Drift.

Hail, snow an' ice that praise the Lord; I've met them at their
work,

An' wished we had anither route or they anither kirk."

—RUDYARD KIPLING.

ALTHOUGH Dr. Georg von Neumayer was disappointed of the command of an Antarctic expedition both in 1870 and in 1871, he never ceased to urge on his countrymen the importance of renewing exploration. His voice perhaps received more attention abroad than at home, but in time the spirit of polar exploration was stirred all the same in the ancient Hansa towns of Hamburg and Bremen. A German Society for Polar Navigation was founded in Hamburg to promote exploration as well as whaling and sealing in the northern seas. Its director, Herr Albert Rosenthal, provided large sums of money for the work of the society, and in the words of one of his countrymen he did more for German polar exploration than the Emperor or the Empire. His attention was turned to the southern as well as the northern polar seas, and in 1873 he sent out one of the Arctic vessels to try her luck off the South Shetlands.

On July 22nd, 1873, the steam whaler Grönland, Captain Eduard Dallmann, sailed from Hamburg and made her way southward along the South American coast,

reaching the South Shetlands at the beginning of the open season on November 18th. It is interesting to find that Dallmann, like Bellingshausen half a century before, met a little fleet of sealing schooners hailing from Stonington, Connecticut, at work around the islands. The charts were not found of much value for navigation, and twice the Grönland discovered new rocks by the good old rule-of-thumb method of running upon them, though fortunately, on each occasion, she slipped off into deep water with her stout timbers none the worse for the shock.

After a disappointing time so far as seals went, Dallmann set out to search the coasts of Palmer Land farther south toward the Biscoe Islands; and on January 9, 1874, he sighted Graham Land in $64^{\circ} 45' S.$, and this was apparently the nearest approach he made to the Antarctic circle. He found that the coast line was quite different from that shown on existing charts, but his rectifications have since been themselves extensively altered, so that it is not necessary to describe them in detail. The most interesting feature he reported was a wide channel running eastward which he named Bismarck Strait, and the land northward of his turning point he found to be a complicated archipelago instead of a comparatively simple mainland. The sea was clear and the weather favourable enough for farther advance southward; but the number of seals was diminishing as the ship proceeded, therefore Dallmann resolved to turn back, and he spent the rest of the season hunting with some success round the South Orkneys. At the end of February the lengthening nights warned him that it was time to leave sub-Antarctic waters, and he made for home, anchoring once more in the Elbe on July 25, 1874, after an absence of a year and three days.

Dallmann reported having seen a large number of

364 SIEGE OF THE SOUTH POLE

whales though not of the most valuable kind. His commercial results were not encouraging enough to secure the dispatch of other steamers, but the first visit of the German flag to the edge of the Antarctic must be looked upon all the same as a very creditable exploit.

The recent researches of Mr. Balch amongst the records of Stonington, Connecticut, have revealed the fact that American sealers continued to visit the South Shetlands, and, before and after Dallmann, sailed along the coast of Graham Land and made landings to the south of Gerlache Strait, but they kept their results to themselves, or a careless public failed to see the interest and importance of the sealing cruises.

Projects for the renewal of Antarctic whaling were frequently mooted, and in 1875 it almost seemed as if New Zealand and the Australian colonies would combine their resources and endeavour to establish the industry from one of the Australasian ports. It would be tedious to cite the different rumours or to detail the various schemes which were started during the following ten years, for the subject was never out of sight. Dr. von Neumayer continued both in Germany and in England to urge the dispatch of a scientific expedition, but on the return of the Challenger in 1876 the scientific director, Sir Wyville Thomson, deprecated anything of the kind. In a lecture on the experiences of the Challenger in the Antarctic he referred to the long series of disasters and the frightful hardships that had marked the history of Arctic exploration, and concluded: "We can only anticipate disasters multiplied a hundredfold should the South Pole ever become a goal of rivalry among the nations."

The argument is not a sound one, for the risk of disaster has ever been the finest incentive to the true explorer,

and it has been happily falsified by the success and good fortune which have attended all expeditions to the far south as compared with those to the far north. The pessimistic view was not shared by the members of the Challenger scientific staff, and except Dr. von Neumayer himself, no one has spoken more strongly and continuously in support of Antarctic exploration than Sir John Murray, and he has been ably supported by Mr. J. Y. Buchanan.

About 1880 Lieutenant Bove of the Italian Navy planned a scientific expedition which was to spend two winters in the Antarctic ice following up Dallmann's discoveries and making a circumnavigation as far south as possible by sailing westward, the direction which our readers are now perhaps tired of hearing has been shown to be the most promising by the troubles which have befallen everyone who followed tradition and the eastward route.

The project was taken up with enthusiasm in Italy, and it seemed for a time as if the nation which now holds the distinction of having carried its flag nearest the North Pole would have anticipated that achievement by planting it first nearest to the South Pole. The time was peculiarly appropriate. A great scheme of circumpolar research had been elaborated on von Neumayer's initiative, in which almost all civilised nations were taking part, so that for twelve consecutive months in 1882-83 simultaneous meteorological and magnetic observations would be made at the highest attainable latitudes right round the North Pole. It was on one of these that Lieutenant Greely of the United States Army and his whole party nearly perished from that terrible danger of polar exploration—a relief expedition which failed to relieve.

366 SIEGE OF THE SOUTH POLE

Similar observations were to be made simultaneously at all observatories in the south of the southern continents, supplemented by a body of French men of science at Cape Horn, and of Germans on South Georgia. Lieutenant Bove hoped to add another to these stations and to be able to observe the transit of Venus of 1882 at some point within the Antarctic circle. Italian enthusiasm went far, but not far enough to raise sufficient funds, and Lieutenant Bove rather than not go out at all accepted a post under the Argentine government for the exploration of Southern Patagonia. On that inhospitable seaboard he met with shipwreck, but was saved by the British mission ship Allen Gardiner. The circumstance got reported in many papers as a disaster to the Italian Antarctic expedition, and it is referred to here merely in order to free Antarctic exploration from the responsibility of causing the loss of a vessel which never sailed or was intended to sail beyond Cape Horn.

The rise and failure of one other attempt to renew exploration claims attention, for although it did not succeed, it helped to arouse the sleeping spirit which animated the latest and greatest attempt to wipe off the stain of ignorance from the South Polar regions. At the meeting of the British Association at Aberdeen in 1885 a paper was read on the renewal of Antarctic research by Admiral Sir Erasmus Ommanney, a veteran officer of the Franklin search whose active service at sea dated back to the battle of Navarino. He had followed the work of Ross with interest, had supported Captain J. E. Davis in his plea of 1869, and he lived just long enough to see the triumphant return of the *Discovery* in 1904. The result of the paper, which was mainly based on Neumayer's work, was the appointment of a strong com-

mittee of the British Association, consisting of Sir Joseph Hooker, Sir George Nares, Mr. John Murray (of the Challenger), Sir Leopold McClintock, General J. T. Walker, Mr. Clements R. Markham, Dr. W. B. Carpenter, and Sir Erasmus Ommanney "for the purpose of drawing attention to the desirability of further research in the Antarctic regions."

Widespread interest was awakened and the colony of Victoria took an active part in forwarding the scheme. The Victorian branch of the Royal Geographical Society of Australasia, and the Royal Society of Victoria brought pressure to bear on the colonial government and secured the promise of liberal premiums to any whalers or sealers who would land cargo in Melbourne procured south of 60° S. The colonists could not afford to send out an expedition without help from the mother country, but they were eager to do what they could.

At home Sir John Murray delivered a powerful address on the Exploration of the Antarctic Regions, in which he declared that a naval expedition of two ships was necessary and that before anything should be done to organise it there must be a guarantee of £150,000 to ensure proper equipment and adequate support for a sufficiently extended cruise. The Council of the Royal Society of Edinburgh very carefully prepared a complete scheme for an expedition to carry on researches in every department of science. The Scottish Geographical Society supported the proposals, but the British Association committee in 1886 deferred their report until other Societies not so forward in their response had given an answer, the committee being strengthened meanwhile by the addition of the great names of Sir William Thomson (Lord Kelvin), Professor Huxley, Sir John Lubbock

368 SIEGE OF THE SOUTH POLE

(Lord Avebury), and Professor Flower. The committee suffered the fate of most committees. It had grown too large; its members, though not without interest in the renewal of Antarctic research, were all individually more interested in other things, and its reports do not indicate any great or effective activity. The Government of Victoria took the first definite action by memorialising the Colonial Secretary and offering to provide £5,000 for a preliminary expedition combining trade and science, if the Imperial Government would provide a like amount. From the wording of the proposal it would appear as if the other Australasian colonies also intended to participate, but whether by subscribing towards the £5,000 or by making supplementary grants did not appear so plainly. The Colonial Office forwarded the proposal to the Treasury with a recommendation that the money should be granted. The Royal Society and the Royal Geographical Society wrote supporting it. It was generally believed that Sir Allen Young, a hero of the Franklin search, would take command of the expedition and subscribe largely to its funds. The importance of any national expedition being on a large scale, under naval discipline and with a purely scientific aim, so strongly insisted upon by Sir John Murray, seems to have been lost sight of, or at least it was not brought forward. The Treasury, perhaps looking beyond the letter of the memorials addressed to it, and divining it may be a lack of conviction in the petitioners, refused to have anything to do with the proposals. The British Association committee lingered on for a couple of years, but having achieved nothing, no doubt because it had not aimed high enough, it was at length disbanded, ostensibly because energetic steps were being taken in Australia. The Mel-

bourne societies were loath to give up an idea that had become popular in the colony, and having been snubbed by the mother-country they tried to enlist sympathy in scientific circles abroad. Negotiations for a joint Swedish and Australian Antarctic expedition were entered into, and rumours circulated that the great geographer Baron Nordenskiöld, the victor of the North-East Passage, would himself lead the expedition, while Baron Oscar Dickson, who had munificently supported the voyage of the *Vega* around Asia, was understood to be ready to make the project financially possible. The name of Fridtjof Nansen, then famous for his crossing of Greenland, was also mentioned as a possible leader. But nothing came of the efforts, and rumours of a German-American expedition directed by Neumayer and financed by a German-American millionaire were justified no better by events.

The renewal of Antarctic research came neither from the zeal of men of science, the fostering care of Governments, nor the wealth of millionaires. It was due to plain business men, seafarers willing to undertake a speculative voyage like the merchant adventurers of old.

Seventy years ago fleets of whalers still sailed from many ports along the east coast of England and Scotland to the Greenland Seas, and much of the Arctic work of the Royal Navy in the earlier decades of the nineteenth century was called forth by the necessity for watching over a considerable source of national wealth and succouring distressed crews. Twenty years ago the Greenland whale (the bowhead or right whale—*Balæna mysticetis*) had grown so scarce that the fleets had dwindled to a few steam-vessels sailing only from Peterhead and

370 SIEGE OF THE SOUTH POLE

Dundee, and the last of the famous whaling skippers of Peterhead was David Gray. Captain Gray had seen the Greenland whale fishery decline from its zenith until it had almost disappeared from sight, so that the capture of one whale had come to mean a successful voyage. The value of the "bone" had run up to an almost fabulous figure, and it is now measured by thousands of pounds sterling per ton.

Captain Gray felt that as even one whale might cover the expenses of a voyage, the reports of abundant black whales in the Antarctic seas were worth enquiring into, and if verified the new field might save the Scottish whaling industry from extinction. He extracted and classified all the many references to "right whales" in Ross's book, and going back to the time of Cook, obtained notes from the logs of various Kerguelen whalers of the temperate seas. He also secured fresh reports from the survivors of the expedition in the *Erebus* and *Terror*, including the private log of Alexander Craig of Peterhead who had served on board the latter ship and knew a whale when he saw it. Captain Gray issued a prospectus in 1891 inviting shareholders in the enterprise and setting forth the facts on which he based his conclusions in a very frank and seamanlike way. The region selected for the experiment was the portion of the Antarctic between the meridian of Greenwich and 90° W., in other words the neighbourhood of Weddell Sea. While the expedition was to be commercial, Captain Gray with his well-known interest in matters scientific had provided for the accommodation of a naturalist on board each ship, for two vessels were considered absolutely necessary. Unfortunately the response of the public was half-hearted, sufficient shares being taken to provide

only a single ship; and the promoters declined to run the risk of sending out a solitary vessel to such unfrequented seas. The money was accordingly returned, an admirably thought out scheme abandoned, and the services of a singularly competent polar navigator were lost.

So far this chapter may have proved dull reading; it has certainly been an unpleasant chapter to write. A record of fair promise nipped, not in the bud, but just before fruition, not once, but again and again, and the labours of colonial enthusiasts, the foremost men of science, naval officers, and whaling skippers equally wasted. Fortunately things took a turn for the better. The continual coming of appeals for renewing Antarctic research had wearied the public into a sort of semi-consciousness that the exploration of the southern ice was in the air, and little surprise was occasioned when it became known in 1892 that a whaling firm in Dundee had resolved to send ships to the Antarctic in the hope of finding a profitable hunting ground there.

On returning from the Arctic regions in the late summer of 1892 four vessels of the Dundee fleet were rapidly equipped for the long voyage to the south. The well-known Arctic explorer, Mr. Leigh Smith, whose famous wintering in Franz Josef Land was only an incident in his polar experiences, took a keen interest in the voyage and secured the appointment to two of the larger ships of surgeons who were specially interested in scientific investigations. The Royal Geographical Society and the Meteorological Office were also induced to equip the ships with instruments for navigation of a much finer description than those usually carried by whalers, and with a complete meteorological outfit.

The ships were typical whalers of small size, immensely

372 SIEGE OF THE SOUTH POLE

strong in construction, being built of successive skins of heavy planking, and sheathed over all with the hard slippery greenheart, the hulls unpierced by any ports or windows. They had stood the test of many years' service in the Arctic seas and their captains were as tough and seasoned as the ships themselves. All the vessels were good sailers, their steam power being merely auxiliary, used for crossing the belt of calms and for manœuvring in the ice, sails alone being trusted to for making a passage in ordinary circumstances and for the actual pursuit of whales: The *Balæna* (400 tons) was built at Drammen in 1872; she was 141 feet long, of 31 feet beam, and under the command of Captain Alexander Fairweather. The *Diana* (340 tons), also built at Drammen, was 135 feet long, 29 feet beam, and sailed under the command of Captain Robert Davidson. The *Active* (340 tons) was built at Peterhead in 1852; she was 117 feet long, and her master was Captain Thomas Robertson. The *Polar Star* (216 tons) was also built at Peterhead, and was only 105 feet long; she was under the command of Captain James Davidson. Mr. William S. Bruce, an Edinburgh naturalist, received the appointment of surgeon on the *Balæna*, and as he had on several occasions taken part in the routine work of Ben Nevis Observatory, he was a thoroughly trained meteorological observer as well. The known enthusiasm and indefatigable perseverance of Mr. Bruce were a guarantee that every opportunity presented to him would be taken advantage of to the full. He was accompanied as a passenger on board the *Balæna* by Mr. W. Burn Murdoch, an artist whose ambition was to paint the Antarctic ice scenery, and who became also the chronicler of the cruise. The surgeon of the *Active* was Dr. C. W. Donald, who, although

following medicine as a profession, was interested in natural science, and had a Shetlander's love of the sea.

The *Balæna* sailed from Dundee on September 6th, 1892, amidst a scene of great excitement, the docks being crowded with friends of the sailors, and members of the public interested in the new enterprise. So long and uncertain a voyage as that contemplated is rare nowadays, and although many of the whalers had never spent a summer at home since they were boys, they had hardly ever spent a winter away from their families. A few scientific friends accompanied Mr. Bruce down the Firth of Tay and were landed at Broughty Ferry in company with half a dozen wretched stowaways. Those unhappy "out-of-works" were unearthed from various hiding-places, and begged hard to be allowed to proceed on the voyage on any terms before they obeyed the peremptory orders to get into the boat. They had evidently no idea of the nature of the new whaling grounds, their one thought being that here was a chance of food at least for a year to come. The *Diana* sailed with the same tide, the *Active* and *Polar Star* followed a few days later, and all of them had a wild burst of bad weather at the outset. Five stowaways were landed from the *Diana* at Stornoway, no less than fifteen from the *Polar Star*, at Blyth, and two more were found on board long afterwards.

The ships saw nothing of each other on the whole long outward voyage, but the *Balæna* and *Active* reached the Falklands on the same day, December 8th, and sailed for the fishing grounds on the 11th, just before the *Diana* arrived. On the way out the *Active* had sailed for a day in company with an American whaler off the coast of Brazil. She had been twenty-seven months at sea hunting the sperm whale in tropical waters. Visits were

374 SIEGE OF THE SOUTH POLE

exchanged, and amongst much interesting information as to sperm-whaling the American skipper gave the news that a Norwegian whaler, the Jason, under the command of Captain C. A. Larsen, was also on the way to the Antarctic.

The ships searched diligently for the bowhead whale in the northwestern part of Weddell Sea, but found none. Other whales, especially finners, hunchbacks, bottle-noses and grampuses, were common enough; but none of these yield any quantity of the valuable bone, and they were not worth securing. The ships do not seem to have gone beyond 65° S., so that they did not enter the Antarctic regions properly so-called. The *Balæna* was never within six miles of any land except at the Danger Islands off Joinville Land, and what scientific work could be done had to be done afloat. There was little opportunity allowed for scientific work, however, for the expedition was purely commercial; the skippers had no mind to waste time that could be turned to money, and as whales could not be found, the crews were set to work to fill the ships with the skins and blubber of seals, which were killed by thousands on the ice. A glimpse of the life on board may be given in the words of a member of the expedition:

“It was with the produce of seals that we were destined to fill our ship, and till February 17th we were literally up to the neck in blood. All the sails are stowed; the captain sits in the crow’s nest from early morning till late in the evening; the two engineers, relieving one another, take charge of the engines; the cook or the steward is on the lookout on deck or on the bridge; and the doctor takes the helm; unless he can manage to get away in the boats, in which case some other non-com-

batant has to take his place; all the rest are away after plunder. Now a full boat is making its way to the ship. We steam towards her. As we near, the engines are stopped and she glides alongside. The cook or the steward rushes from the look-out, the doctor from the wheel, one working the steam-winch and the other unswitching the skins, while the boat's crew swallow a hasty meal. The boat being unloaded, they are off again for another fill. Another boat is seen approaching, and away we go again, dodging this piece of ice, charging that piece with our sturdy bows, boring a way where the ice lies closely packed, rounding this berg, and on to the next until we reach the boat, which is down to the gunwale in the water, with its crew cautiously plying their oars as they lie crouched upon their bloody load. So it goes on from day to day."

In such conditions exploration was out of the question; if the ships could be filled in 63° S. the captains would never dream of going to 64° . The *Active* however was more fortunate than the *Balæna*. Captain Robertson had more than once done a bit of exploration in the little known fjords of East Greenland, and he turned the eye of an explorer on the coast of Joinville Land. The southern part he found to be separated from the northern and he named it Dundee Island; it lies on the north side of Erebus and Terror Gulf. The channel between the two islands was navigated by the *Active*, which left her name on a reef where she grounded and whence she happily escaped uninjured. A landing was made on a beach on the south side of Joinville Land where the snow had melted away, and it was seen that the ice-cap of the island and that of Louis Philippe Land would be easily accessible from the shore. Dr. Donald

376 SIEGE OF THE SOUTH POLE

paid a visit to the Jason when all five ships were lying close together, on January 24th, 1893, and found Captain C. A. Larsen, who had been sent out by the Oceana Company of Hamburg, full of interest in the geographical problems of the locality.

From the same ship some years before Larsen had landed Fridtjof Nansen on the east coast of Greenland to make the first of his successful journeys on the bold principle of leaving no way open for retreat. The stimulus of meeting a scientific enthusiast like Nansen may well have left its influence, and Larsen had landed on the South Orkneys on his way to Weddell Sea, and again on Seymour Island at the south end of Erebus and Terror Gulf, where he had picked up a number of fossils. This was a discovery of great interest to geologists, for they were the first indisputable evidence of the existence of sedimentary rocks on Antarctic land. Captain Larsen believed he had seen land to the westward when in latitude $64^{\circ} 40'$ S. and longitude $56^{\circ} 30'$ W. and this, which was also noted from the Balæna as at least an "appearance of land" was undoubtedly the east coast of the land known on the west as Graham Land.

The Dundee ships were filled up with sealskins and oil before the end of February, the Balæna having secured about 6000 seals, the Active and Diana about 4000 each, and the Polar Star about 2000. The fleet left the Falklands early in March, and by the middle of June, 1893, they were safely docked in Dundee. Without having been an absolute failure the experiment was not so successful as to lead to its repetition, nor was the experience of the scientific observers altogether a happy one. They certainly made the best of their opportunities, but the opportunities were fewer and farther between than had

been expected, and the sealers were, naturally enough, not particularly sympathetic with proceedings they did not understand. It became quite clear that unless under a very exceptional captain a commercial voyage can yield comparatively little of scientific value.

The Germans seem to have been better pleased with the results of their seal-hunting, for the following year found Captain Larsen back again with the *Jason* in Weddell Sea for the Oceana Company, while the *Hertha*, Captain Evensen, and the *Castor*, Captain Pedersen, tried their fortune on the other side of the land in the sea previously traversed only by Bellingshausen and Biscoe. These voyages really advanced exploration, and Larsen in particular made some interesting discoveries. After sealing for some time among the floes east of Seymour Island, he steered southeastward, and on December 1st, 1893, was close to high land covered with snow, in latitude 66° S., longitude 60° W. In accordance with custom he named it after his sovereign, Oscar II. Land; the prominent cape was called Cape Framnes, and a lofty mountain, Mount Jason. This was to all appearance the eastern coast of Graham Land, and no doubt the New South Greenland of the early Yankee sealers. Part of the slopes of Mount Jason were free from snow, and the land looked tempting to explore, with great glaciers running down from vast snowfields to the sea. Larsen sighed for his *ski* and a clear conscience to land and travel over the snowy expanse, but duty kept him to his ship and the search for whales and seals. He continued to coast southward along the broad strip of ice fast to the land, the sea ice proving most favourable to his advance, and on December 3rd the *Jason* had the honour of being the second steamer to cross the Antarctic circle. The

378 SIEGE OF THE SOUTH POLE

ship kept on a course nearly due south, along the edge of the flat shelf or barrier of ice that extended outwards from the coast, until on the 6th, farther advance was barred by heavy ice in $68^{\circ} 10' \text{ S.}$ The land appears to have been continuous all the way, and to a very mountainous portion of it rising into four conspicuous peaks Larsen gave the name of Foyn's Land, after the great Norwegian whaler, who, had he lived, might have proved a second Enderby in promoting Antarctic work.

On the return voyage an island was discovered lying some distance off the coast, in about 66° S. , and named Robertson Island, from which a chain of smaller islands, named collectively the Seal Islands, ran to the northwest. Immediately to the north, two active volcanoes came in sight in latitude 65° S. , the larger on an island called Christensen Volcano, and the smaller connected to it by sea-ice. Captain Larsen landed on the ice close to Christensen Island and travelled over the soft snow on *ski* for some distance. The surface of the ice was strewn in places with blocks of volcanic rock evidently recently ejected by the volcano. On the snowy margin of the island there were swarms of young seals, very fat, and friendly to the strangers, and luckily for themselves, separated from the sea by so wide a stretch of soft snow that they were left in peace. The interior was seen to be nearly free from snow, but it was impossible in the time to get more than four miles from the edge of the sea-ice surrounding the island, and the uncovered land was not reached. Many other small islands were seen and charted, and after filling his ship with seals, visiting the coast of Tierra del Fuego in the unsuccessful search for whales, and discharging his cargo at Port Stanley, Larsen found time to make another trip to Erebus and

Terror Gulf before the season closed. This fine season's work had not been surpassed in geographical interest by any sealing vessel since the voyage of Balleny.

The Jason was a ship with a destiny before her as well as a history behind. Re-named the *Stella Polare*, it was to be her fate to carry the Duke of the Abruzzi's Arctic expedition to Franz Josef Land, whence Captain Cagni attained the nearest approach yet made to the North Pole. But while the Jason was still in Antarctic waters the *Hertha* and *Castor* were proving worthy consorts. They were working amongst the islands of the South Shetlands, and southward west of Palmer Land. Captain Evensen reached an even higher latitude than Larsen had done on the other side. He made his way southward to the west of Palmer Land, passed between the Biscoe Islands and Graham Land, and on November 9th he crossed the Antarctic circle, much surprised at finding so little ice at the very beginning of the open season. Next day Adelaide Island was sighted and drift ice encountered. After a detour to the northward along the Biscoe Islands the *Hertha* again worked to the southwest, and on November 21st reached the remarkable latitude of $69^{\circ} 10' \text{ S.}$ in $76^{\circ} 12' \text{ W.}$ without hindrance from ice. Next day she sighted Alexander I. Land, having come very much nearer to it than either Bellingshausen or Biscoe; but unfortunately beyond the positions we have quoted Evensen's voyage has added little to our knowledge. On December 14th he met the other Norwegian ships off Joinville Island, and remained in company until they finally left Antarctic waters in March, 1894. The three ships returned to Norway in July of that year.

Svend Foyn of Tönsberg was the acknowledged chief of the whalers of Norway, a man of the most remarkable

380 SIEGE OF THE SOUTH POLE

perseverance, courage and originality, whose genius had grappled with the problem of killing the hitherto invulnerable blue whale or finner, and the creator by that achievement of a great fortune for himself and a new industry for Norway. When his countryman, Mr. H. J. Bull, who had been captivated by the fascination of the Antarctic, had tried and failed to induce Australian capitalists to invest money in an attempt to renew Antarctic whaling, he left Melbourne, returned to Europe, and applied at once to Commander Foyn. The veteran was eighty-four years old, and his life had been spent in perfecting the whale fishing off his native coasts and in the Arctic seas, but he was willing to help a new enterprise in the other hemisphere; and, entering keenly into the plans, he placed a vessel at the disposal of Mr. Bull.

For this purpose he purchased the whaler *Cap Nor*, built at Drammen in 1871, a vessel similar in build to the *Balæna* and *Active*. For her new work she was rechristened *Antarctic*, and sailed under the command of Captain Leonard Kristensen, with Mr. Bull on board, in September, 1893. On her way out she spent some time sealing at Kerguelen, and reached Melbourne at the end of January, 1894. Mr. W. S. Bruce, fresh from his experience on the *Balæna*, applied to Commander Foyn for permission to accompany the *Antarctic*, and the Director of the firm publicly expressed his regret that the quick despatch of the ship made it impossible for Mr. Bruce to reach Melbourne in time to join the vessel.

Amongst others bitten by the fever of adventure was a young colonist of Norwegian birth, though partly English in ancestry, Carstens Egeberg Borchgrevink, who had had some experience of land-surveying and proved himself of the most irrepressible persistency in gratifying

his ambition. He tried hard to be taken on board the Antarctic as a passenger, but the captain would have no passengers in his ship; he offered to go in any capacity, and got his way at last by "signing on" as an ordinary seaman. The voyage of the Antarctic has been described by the promoter, Mr. Bull, the master, Captain Kristensen, and also by Mr. Borchgrevink, the various versions agreeing as regards the events of the voyage, with which alone we have to do.

The Antarctic left Melbourne in September, and spent a few months sealing round Macquarie Island, and along the edge of the Antarctic pack which was met in latitude 58° S. After a visit to New Zealand to repair damage received in heavy weather, she sailed again on November 28th, 1894, and in little more than a week, entered the pack ice in 63° S., $171^{\circ} 30'$ E. The Balleny Islands were sighted on the 14th, and the Antarctic circle touched on the same day and crossed a week later. The midnight sun was visible on Christmas Eve, but the ship continued a prisoner in the pack, and it was not until January 14th, 1895, that she worked her way into open water in latitude $66^{\circ} 55'$ S. Two days later Cape Adare at the northern end of Victoria Land was sighted for the first time since Ross's voyage, and two more days brought the Antarctic up to Possession Island, where a landing was made, the party finding the place aswarm with penguins exactly as Ross had found it fifty-five years before. Here Borchgrevink made a botanical discovery of considerable interest, a lichen growing on the rocks, the first evidence of plant life obtained within the Antarctic circle. Possibly enough this discovery would have been made on the former visit had it been the turn of Hooker instead of that of McCormick to land with Ross, the

382 SIEGE OF THE SOUTH POLE

senior medical officer of the Erebus having more interest in birds than in plants. Coulman Island was sighted on January 22nd, and then in latitude 74° S. Kristensen decided to turn back as no whales were to be seen. Next day the ship was back at Cape Adare, and here the first landing upon the Antarctic continent was made on a low beach at the base of the cliff. The penguins were even more numerous than at Possession Island, and the same lichen was found growing on the rocks. Returning northward the Antarctic made her way through the pack in six days, and entering the open sea on February 1st, she pursued her voyage in temperate waters and reached Melbourne on March 14th.

The voyage was not a commercial success and has not been repeated. The "right" whale was not found; the ship was too large, and the gear was perhaps too light for taking the finner; but the voyage was an interesting demonstration of the facility of visiting Victoria Land, and supplied a strong argument that the open sea found by Ross south of the pack was not a temporary incident, but the normal feature of an ordinary year.

The last effort of the whalers and sealers had done much to spread interest in Antarctic navigation, and it had done more in training men who were destined to take leading parts in the great scientific expeditions which were to follow.

CHAPTER XIX

THE FIRST ANTARCTIC NIGHT

“When the shadow of night’s eternal wings
Envelopes the gloomy whole
And the mutter of deep-mouth’d thunderings
Shakes all the starless pole.”

—TENNYSON.

EXPLORERS of the South Polar seas so far had flitted to and fro like summer migrants, coming after the late spring and retiring northward when the first breath of autumn crisped the surface of the sea. They had found the summer cold and changeable, liable at any time to showers of snow and chilling fogs, the mercury of the thermometer hovering in its boldest ascents close to the freezing point, and too frequently retreating to the neighbourhood of Fahrenheit’s zero; but yet it was summer, the best quarter of the Antarctic year. Every explorer has spoken of the marvellous beauty of a fine Antarctic day, the unbroken genial sunshine, twice round the clock, the black rocks throwing off their white covering, and growing hot under the persistent radiation, the soft snow on the levels dissolving into water which gathered into streams and almost rivers, every block of ice on land or sea musically adrip, and sea and land alike loud with the hoarse voice of birds, no sweet songsters among them, but every throat clamorous with life.

For hundreds, if not for thousands of years the Arctic night has been familiar. The Greek philosophers knew of the land of winter darkness, the northern Scandina-

384 SIEGE OF THE SOUTH POLE

vians grew up with December, the month without a sunrise, as the dark background of their life; and whalers liable to be caught in the ice as they lingered to the end of their short working season, grew expert in devices for counteracting the effects of intense cold and month-long darkness and inaction. But the winter of the south remained absolutely unknown, the only clue to its severity being the solitary minimum reading of -5° on Deception Island when the registering thermometer left by H. M. S. Chanticleer was recovered by Captain Smiley. The importance of observing winter conditions in the Antarctic had become a plank in the platform of the few indefatigable enthusiasts who were still hopeful of securing the dispatch of a properly equipped expedition capable of utilising to the full opportunities which whalers, who had to pay their way, could only recognise and pass unused.

The meeting of the Sixth International Geographical Congress in London in 1895 under the presidency of Sir Clements Markham was made the occasion of an interesting discussion following a long historical paper by Dr. von Neumayer and an account by Mr. Borchgrevink of Captain Kristensen's successful landing on the Antarctic continent. Sir Joseph Hooker, the last survivor of Ross's great voyage, Sir John Murray, representing the Challenger expedition, and Sir Erasmus Ommanney, whose efforts at one time seemed likely to launch a new ship for the south, took part in the discussion. The Congress adopted a resolution, which may be looked upon as the formal beginning of the strenuous efforts to explore the Antarctic at the close of the nineteenth and the opening of the twentieth centuries. It ran:

"That the Congress record its opinion that the explora-



A. de Erlacker

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TILDEN FOUNDATIONS

FIRST ANTARCTIC NIGHT. 385

tion of the Antarctic Regions is the greatest piece of geographical exploration still to be undertaken. That in view of the additions to knowledge in almost every branch of science which would result from such a scientific exploration the Congress recommends that the scientific societies throughout the world should urge in whatever way seems to them most effective, that this work should be undertaken before the close of the century."

The direct result was not immediately visible and before the great system of national expeditions for exploration and research at which it aimed took effect, there were two independent attempts to penetrate the southern ice, each of which added considerably though in different degrees to our knowledge of the region. One sailed under the Belgian, the other under the British flag, but both were in Norwegian-built ships, manned largely by Scandinavian sailors.

Adrien de Gerlache, a lieutenant in the Belgian navy, had been a prey to the fever of Antarctic exploration from his youth. He had been one of the many volunteers called forth by the announcement in 1888 of a possible Australian-Swedish expedition under Baron Norden-skiöld. Some years later, in 1894, he propounded a plan for an expedition which he would himself lead, and succeeded in interesting M. Solvay, a wealthy Belgian man of science, to such a degree that he subscribed £1000 to the funds, and sent the would-be explorer for some preliminary training in the Arctic ice. In the following year the Brussels Geographical Society opened a subscription list and a grant from the Government of £4,000 made it possible to commence preparations, and in 1896 a ship was bought. She was a stout Norwegian

386 SIEGE OF THE SOUTH POLE

sealer of about 250 tons, known as the *Patria*, and appropriately enough re-named the *Belgica*.

The nucleus of a scientific staff was brought together, and these assisted heroically in the necessary but often nearly hopeless task of endeavouring to raise funds; the departure of the ship was delayed for a year in consequence of the difficulty of getting money. Gerlache was fortunate in securing the coöperation at an early date of Henryk Arctowski, a Russian Pole, whose ardour in the pursuit of the sciences of chemistry, geology and meteorology made him eager to seize the opportunity of entering an absolutely virgin field. A Rumanian naturalist, Emile Racovitza, of equal enthusiasm in his own department, was also enlisted, and others were gradually added, for the intention was to make the *Belgica* a purely scientific expedition. In the summer of 1897 a desperate effort to raise additional funds by holding a sort of exhibition and fancy fair was at last successful, thanks mainly to the coöperation of Mme. Osterrieth who acquired thereby the friendly title of Mother Antarctica. After all only £12,000 had been obtained from start to finish, and on that grotesquely inadequate sum the whole of the equipment and work of the *Belgica* was carried out.

On August 16th, 1897, the ship left Antwerp, and on the 24th finally departed from Ostend. M. de Gerlache was in command of the expedition, with Lieutenant Lecoq, also a Belgian, as second in command and Roald Amundsen, a Norwegian, as mate. The scientific staff consisted of Lieutenant Emile Danco, a Belgian, as magnetic observer, Emile Racovitza, the Rumanian naturalist, Henryk Arctowski and his assistant, Antoine Dobrowolski, both Poles; but the surgeon had given up his post at the last moment and the ship sailed without one. The

FIRST ANTARCTIC NIGHT 387

two engineers were Belgians, and of the nine sailors four were Belgian and five Norwegian.

Dr. Frederick A. Cook, an American surgeon who had accompanied Peary in one of his Greenland journeys and had for years set his heart on seeing the Antarctic regions also, cabled to Gerlache, knowing nothing of the difficulty as to a medical man, but asking if he could by any means be taken with the expedition. He had himself tried and failed to get up an American expedition, and now gladly responded to Gerlache's cabled permission to join at Rio de Janeiro.

The Belgica, with her cosmopolitan company, proceeded very slowly on her way, lingering unaccountably in the channels of Tierra del Fuego, where any ship could go at any season, and not leaving Staten Island until January 13th, 1898. It will be remembered that Larsen and Evensen had attained their highest southern latitudes in clear seas two months earlier in the season four years previously. Even at that late date much work was done which certainly should not be neglected, but might quite suitably have been left until the return journey. This consisted in running a line of soundings from Cape Horn to the South Shetlands, a tract of sea that had never been sounded before.

On January 20th the South Shetlands were sighted, and the ship ran on a rock, giving rise to some alarm but no damage. The weather grew bad, and as the Belgica proceeded southward she had the misfortune to lose one of the Norwegian sailors, who fell overboard and could not be saved despite desperate efforts on the part of those on board.

Proceeding into Hughes Gulf, Gerlache discovered a wide channel running southwestward and separating

388 SIEGE OF THE SOUTH POLE

what appeared to be the mainland from an archipelago of large islands forming the remainder of Palmer Land. Three weeks were spent in this strait, to which the name of the ship was first given, but afterwards that of the commander. No less than twenty landings were made and magnificent collections of geological and natural history specimens secured. For the first time the sub-Antarctic land was invaded by men of science who could take full advantage of their opportunities. Too much perhaps was attempted, but a great deal was done, and a double line of Belgian names scattered down the map from 64° to 65° S. fixed the features of the coast, which was charted with enough care to give us more confidence in the positions of the various islands, headlands and channels, than was possible before in any part of that region.

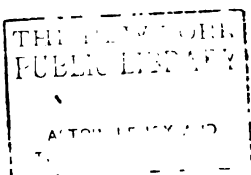
The scenery was typical of Antarctic land, black rocks projecting from sweeping snow-fields which ran down into a ledge of glacier ice along the shore, with here and there a beach of pebbles where a landing could be made. During the excursions on the snowfields in bright weather the heat of the sun was so intense as to become almost unbearable, a fact which makes the volume of the snow the more remarkable. Near the sea, where the rocks were bare and trickling with water, lichens and mosses were found in some abundance, and even a few insects of a very humble type. Never before had a single degree of latitude in the immediate neighbourhood of the Antarctic circle received so minute an investigation, but the scientific men were insatiable and remained unsatisfied. Arctowski describes one of the landings in these words:

“The commandant showed himself very obliging; but



Typical Landscape of the Palmer Archipelago.

(Photograph supplied by the Belgian Antarctic Expedition.)



FIRST ANTARCTIC NIGHT 389

with a little good-will we could have landed in many other places and collected much more geological material than we did. For this eighteenth landing he conducted me himself but for ten minutes only. A few strokes of the oars brought us to the beach amid cries of 'Hurry up, Arętowski!' I gave a hammer to Tellefsen with orders to chip here and there down by the shore, while I hurriedly climbed the moraine, picking up specimens as I ran, took the direction with my compass, glanced to the left and right, and hurried down again full speed to get a look at the rock *in situ*; meanwhile Cook had taken a photograph of the place from the ship—and that is the way geological surveys have to be carried out in the Antarctic."

On February 12th, 1898, the Belgica left the strait and passed southward along the coast of Graham Land at a date when all previous expeditions in these waters had been making haste for home. Icebergs became more numerous and the sea along the coast was beset with rocks which made navigation slow and difficult. On February 15th the Belgica crossed the Antarctic circle steaming southwest. Next day Alexander I. Land came in sight, but could not be approached as the ice-pack extended for twenty miles from the shore. It lay to the south and seemed an aggregate of mountains above which some lofty peaks rose boldly. The glaciers descending from these mountains coalesced along the shore in a broad terrace or ice-foot which merged into the pack. A large island or mountain was seen to the east, apparently forming the southern extremity of Graham Land, which seemed to be separated from Alexander Land by a strait or at least a gulf. Too much stress must not be laid on the features of land seen at so great a

390 SIEGE OF THE SOUTH POLE

distance, and indeed different members of the Belgica's company gave different descriptions of what they saw, which after all was little more than had been seen by Bellingshausen when he first lit upon that lonely sentinel of the south.

The course was continued southwestward until on February 28th the ship was in $70^{\circ} 20' \text{ S.}$, and 85° W. A gale was blowing against the ice from seaward and great gaps were torn in the edge of the pack, affording tempting openings toward the south. Despite the serious lateness of the season, and disregarding the views of the scientific staff who were anxious to place the results of their work in safety before risking the ship in unknown perils, Gerlache thrust the Belgica into one of the openings, and pushing his way southward with increasing difficulty he reached $71^{\circ} 30' \text{ S.}$ on March 3rd. An attempt was then made to return, but it was too late. After advancing a few miles to the northward the ship was gripped fast in the pack, and for a year and a month she lost all power of independent movement.

The ship was not too well prepared for wintering in the farthest south, but everything possible was done to minimise the inevitable hardships. Although the scientific staff had not been anxious to enter the ice, each member seized the opportunity which was thrust upon him, resolved to take the fullest possible advantage of the unique experience. The ice gradually thickened, but holes could easily be cut in it, and through these holes the minute creatures living in the sea-water, the plankton, were caught by fine tow-nets; the depth was ascertained and observations of temperature were made at all depths in the water. It was soon apparent that although the Belgica could not move away from the floe that held her, the ice itself was

never at rest, but drifted within certain limits in all directions, the several floes being joined by leads covered with thin ice which bent and cracked in bad weather giving the pack as a whole a sort of flexibility and power of movement. The position was fixed by observations of the stars whenever it was possible to do so, and the drift could thus be traced from point to point. The course of the ship showed no general onward movement like that of the *Fram* across the Arctic Sea; it resembled nothing so much as a hank of tangled wire. Several times the ice shifted northward until the latitude was a little less than 70° , and the depth increased to nearly 1,000 fathoms, and several times it drove south until the latitude exceeded $71^{\circ} 31'$, and the water was only 210 fathoms deep. On the east the limit of the drift was $80^{\circ} 30' W.$ and before the ship got free again she was in $102^{\circ} W.$

The nights grew longer and on May 15th the sun set almost at noon, not to appear again for seventy days, though three days later a party from the ship, climbing a high iceberg, caught a glimpse of half the dull yellow disc peeping above the northern horizon. During the whole dark duration of these ten weeks the *Belgica* wandered aimlessly about, clasped in the ever writhing and rending but unrelenting ice. Fierce storms blew over her and the ice cracked with horrid noises and rose in pressure ridges, but though land no doubt lay to the south there was no shore near enough to offer resistance sufficient to bank the ridges to a dangerous height, and the storms passed, leaving the hull unhurt.

The brilliance of the moonlight or the weird glow of the aurora australis occasionally lit up the rough surface of the pack and the sheets of level snow with lights and shadows more cheerless than the darkness itself. De-

spite all efforts to work and keep cheerful the darkness entered into the soul of the ship's company, oppressing them more than the cold and more than the inadequate and uninviting food. The food was abundant enough, but much of it was in the form of specially prepared extracts and fibreless meats and fish, the condensed nourishment of which ceased to nourish, and for some unexplained reason the natural dislike to penguin flesh was very slowly overcome. Dr. Cook attributed the low state of health on board—a sort of polar anæmia—to the unsatisfactory diet as much as to the darkness. All suffered from impaired circulation and deranged digestion, the heart seemed to lose its regulating power, and gave rise to alarming symptoms, while the complexion became deathly pale, almost greenish. The groaning and crashing of the ice in the blackness of the endless night was a horror to listen to and the sound could not be evaded, nor the darkness dispelled, nor the cold resisted outside or the damp within. Dr. Cook repeatedly refers to it all as "hellish."

Lieutenant Danco, whose heart had not been sound when he started, was unable to resist the accumulation of miseries which reduced the strongest to a state of lethargy and depression. He died on June 5th, before mid-winter, and was buried at sea through a hole cut in the ice, the commandant making "a few fitting remarks," for the sound of no religious service ever rose through the darkness of the first Antarctic night. Lecoq fell seriously ill and everyone was affected more or less in mind or body or both. "We live in a mad-house," said one of the cabin party. Dr. Cook devised a treatment for polar anæmia which seemed effective. It consisted in trying to do the work of the absent sun by exposing the pa-

FIRST ANTARCTIC NIGHT 393

tient's skin to the glow of the hottest fire that could be obtained.

The winter passed. It was not without discovery, for as the ice was driven about, south, east, west and north, with apparently no serious check, it proved that the open sea extended far in all directions, and as Bellingshausen's Peter I. Island lay to the north of the drifting ship it was clear that the first-found of all Antarctic land was a lonely islet and not the immediate outpost of a continent.

The light returned before the middle of July, when for an hour or two about noon the dawn day by day made it easy to read for a longer and longer time. Each day the colours of the sky at noon grew brighter on the northern horizon, and on July 22nd the sun appeared. The return of day brought life with it, the health of the ship's company improved, and the scientific observations which had dragged heavily were resumed with a fresh zest. But the impulse was temporary. The sun brought tempestuous weather and the cold increased, the lowest temperature of the whole period being reached on September 8th, when the thermometer registered 45 degrees below zero Fahrenheit and the mercury froze.

Summer came on with its perpetual sun, Christmas Day passed, New Year's Day 1899, passed, but the ice remained unchanged. The particular floe in the centre of which the Belgica was frozen was about four miles in diameter, and unless it broke up speedily the awful prospect of another winter would have to be faced. All hands were set to work to blast and saw a passage for the ship to the lane at the edge of the floe, but this was a serious matter with ice ten feet thick. The food supply was running low, and, willing or unwilling, the workers had to support their strength on penguin and seal meat;

394 SIEGE OF THE SOUTH POLE

but hard work and hope made the unsavoury food so welcome that seven meals were disposed of in the twenty-four hours. On the 14th, thanks partly to the cutting and partly to the wind the ship broke loose and was water-borne once more, but another month elapsed before she was able to win her way to the open sea, and it was March 28th, 1899, before she steamed into Punta Arenas. Never before were the bleak shores of Magellan Strait so welcome to the seafarer, and the harsh autumn wind from the forests of Tierra del Fuego was laden with all the perfumes of spring to the worn-out explorers who for more than a year had lived in a world of ice with no natural odour more fragrant than a penguin rookery.

The Belgica had a splendid reception when after lingering in South American ports she returned to Belgium early in November. The expedition was of unprecedented importance from the duration and regularity of the routine scientific observations in the far south, the completeness of the collections and the zeal and courage of the cosmopolitan scientific staff who toiled in great discomfort without even the consolation of free conversation in any language equally understood by all. The Belgian Government undertook the elaboration and publication of the scientific results in the most generous manner, and the work of the Belgica will be an enduring monument of scientific enthusiasm.

The Belgica had found no new land south of the Antarctic circle, but during most of the drift she had been in water less than 250 fathoms deep, gradually shoaling toward the south, in fact on a continental shelf similar to that which belts about the sea-washed continents, though submerged to a somewhat greater depth. The suggestion is inevitable that somewhere not very far to



Carstens Egeberg Borchgrevink.
(Photograph by Messrs. Thomson, London.)

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the south there is extensive land. The temperature of the air in the Antarctic summer south of 70° S. was found to average 29° F., not half a degree higher than was found by the Fram north of 84° N.; the mean temperature for the year was found to be 15° F. while the mean for July, the coldest month, was -8° and that for February, the warmest month, 34° .

Mr. Borchgrevink who had sailed before the mast on Mr. Bull's Antarctic whaling expedition of 1894-95 had on his return to Europe tried hard to get up a trading expedition to proceed to Victoria Land in the hope of securing a remunerative cargo, perhaps guano from Possession Island; but the scheme fell through. In 1898 however he succeeded in inducing Sir George Newnes to fit out a scientific expedition in a single ship, and the plans were made without requesting any official recognition. The ship was an old Norwegian whaler, the Pollux, similar in size to the Balæna, and she was provided with new engines of unusual power for the occasion, as well as with a new name, the Southern Cross. Mr. Borchgrevink was singularly fortunate in the selection of his staff. As captain of the ship he had Bernhard Jensen, whose interest in the Antarctic regions had led him to join the whaler Antarctic as second mate in 1894, although for many years he had commanded his own ship in the Arctic whaling trade. William Colbeck, a sub-lieutenant in the Royal Naval Reserve, and a first-rate navigator and sound surveyor, was chosen as magnetic observer, and Louis Bernacchi, a British subject of Tasmanian birth, who had been trained in the Melbourne Observatory, went as meteorologist. Mr. Bernacchi had been promised a berth on the Belgian expedition if the original intention to call at Melbourne had been carried out; but as time passed and it became

396 SIEGE OF THE SOUTH POLE

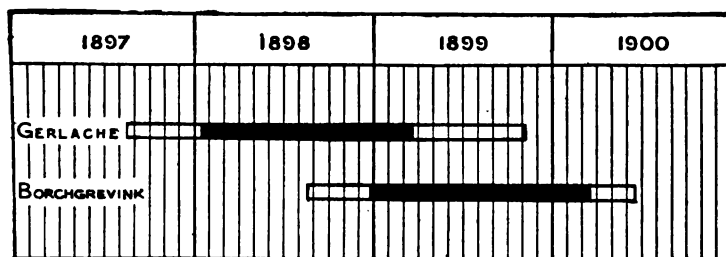
plain that the Belgica had been caught in the ice, he came to London in order to apply for a post on the Southern Cross. The other members of the staff included Dr. Herlof Klövstad as surgeon, Anton Fougner, Nicolai Hanson, an experienced natural history collector and zoölogist employed at the time of his appointment at the Natural History Museum in London, and Hugh Blackwell Evans, a typical young Englishman and thorough sportsman, as assistant zoölogist. From such men much was to be expected. The expedition carried a number of dogs with two Lapps as dog-attendants. Although the Southern Cross had been equipped privately without consultation with the National Antarctic Expedition, which was then taking shape, and without any definite scheme for coöperation or arrangements for relief in case of disaster, Mr. Borchgrevink laid his plans before the Royal Geographical Society on the eve of sailing, and received a hearty send-off from many individuals interested in science as he left the Thames on August 22nd, 1898. The voyage to Hobart occupied ninety-eight days and after a short stay there the Southern Cross left for the south on December 19th.

The ship soon fell in with the pack and had a long and difficult time in it. Despairing at last of getting through in the neighbourhood of Balleny Islands the commander worked northward again to the open sea after forty-eight days in the ice, and re-entered the pack farther east, where it was lighter. In six hours the pack was passed through and the Southern Cross ran into open water on February 11th, 1899, in latitude 70° S., longitude 174° E. Land was sighted on the 16th, and on February 17th the first anchor ever dropped within the Antarctic circle struck ground in Robertson Bay off the low peninsula where

FIRST ANTARCTIC NIGHT. 397

Kristensen had landed from the whaler *Antarctic* in 1894 at the foot of Cape Adare.

So it happened that at the same time in nearly the same latitude, but on opposite sides of the vast unknown Antarctica, all hands on board the *Belgica* were toiling with all their might to break from their prison in the floe before



SYNOPTIC DIAGRAM OF THE FIRST TWO EXPEDITIONS WINTERING IN THE ANTARCTIC.

NOTE—Each vertical column represents a month. The horizontal bands show the duration of the expeditions, the period passed south of 60°S. being shown in solid black.

a second winter befell; and all on board the *Southern Cross* were straining every nerve to unload stores and the material for a house in which to pass the first long night on land within the southern circle. The task of unloading was hard enough as heavy gales sometimes prevented communication between ship and shore, and the time was short if the *Southern Cross* was to escape from the dangerous bay before the young ice formed. By March 2nd the preparations were made and the ship departed to winter in New Zealand, while a party of ten all told settled down for a year of unknown hardship. In addition to the commander and the scientific staff there were

398 SIEGE OF THE SOUTH POLE

the two Lapps in charge of the dogs and a Norwegian cook. Meteorological and magnetic observations were started and natural history collecting undertaken, but the exploration by land, of which much had been hoped, was of very small account. The pioneers of the Antarctic land were after all closer prisoners than the wanderers in the Antarctic pack. A few excursions along the shores of Robertson Bay or across its ice, climbing the cliff of Cape Adare to a height somewhat exceeding 3,000 feet, and looking at the coast to the south, summed up the exploits. The interior ice-cap was not reached, and no land exploration in the ordinary sense of the word was accomplished. The scientific observations however were interesting, though had the commander of the expedition been more fully instructed in the method of getting the best work from his expert assistants, by leaving them a free hand in their several departments, they might quite possibly have been better still. In Antarctic exploration as in life generally, however, there is always the consolation that while things could have been better than they are, they might also have been worse; and despite some faults the expedition of the Southern Cross did excellent work.

The winter proved terribly severe. The storms which shook the little wooden house were of an altogether unexpected fury, and fierce blizzards drove the snow in blinding sheets which made it impossible to walk or even to crawl on all-fours from the hut to the thermometer screen. The sun did not appear above the horizon from May 15th to July 29th, a period of seventy-five days, for Cape Adare in latitude $71^{\circ} 15' S.$ was practically the same distance from the Pole as the Belgica during her drift; but there was no day during the winter on which a glimmer of

FIRST ANTARCTIC NIGHT. 399

twilight at noon failed to remind the watchful that the sun was shining far off over the round of the Earth.

A peculiarity of the storms was the occasional sudden rise of temperature with a south wind, the thermometer sometimes leaping from -35° to $+20^{\circ}$ (a rise of 55 degrees) in a few hours. The party got on no worse than the majority of polar wintering parties, and they probably felt the melancholy-breeding monotony less than many, for they had excellent tinned foods and made a point of eating seal and penguin flesh and penguin eggs at every opportunity. The general health was good, there was no heart trouble and the distressing symptoms from which the Belgian expedition suffered were almost wholly absent.

A terrible catastrophe was narrowly escaped towards the end of the winter. The hut caught fire from the careless placing of a candle, and the flames were extinguished with difficulty. However no great harm was done, and the escape was a useful lesson in caution.

A more serious trouble of the long night was the illness which attacked Mr. Hanson, the zoölogist. It presented some of the symptoms of scurvy, but if it were that disease it affected only one of the party, though all fared alike. Mr. Hanson grew rapidly worse and died in the beginning of spring, on October 14th, 1899, the day when the first sign of the new season appeared in the return of the penguins from their northern winter quarters to their southern nesting places. He was buried in a grave blasted in the frozen soil and dug deep into the heart of the underlying ice of a buried glacier. The two Lapps, who were much affected, concluded the funeral service by chanting a hymn in their own strange language. Spring advanced and the summer of the Antarctic came with the never-dip-

ping sun, the swarms of breeding penguins crowding on every spot of bare land and up the cliffs for a thousand feet, and the seals basking on the shore. A bright look-out was kept for the return of the ship, but mid-summer passed and the first month of the last year of the nineteenth century was nearly done. Deferred hope at length made the watch slack, but suddenly one morning the sleeping party in the hut was aroused by a fresh voice shouting "Post!" and there stood Captain Jensen laden with letters and newspapers. This was on January 28th, and on February 2nd, 1900, men and dogs had embarked on the Southern Cross, and the hut was left by itself in good condition with stores enough to be of material service to any later travellers who might wander there.

The course was laid southward along the coast charted by Ross, and some fine photographs were obtained of the islands and promontories as well as sketches, for Mr. Borchgrevink could draw well. The photographs show a remarkable similarity to the scenery of the Palmer archipelago, the snow from the upper slopes accumulating below the cliffs to form a confluent shore glacier from which miniature icebergs break off. But in addition the coast of Victoria Land was seamed by great glaciers descending from the immense plateau behind, and sometimes thrusting their icy tongues far into the sea. A landing was made on Coulman Island in $73^{\circ} 20' \text{ S.}$, but the stay on shore was limited to twenty minutes, the highly magnetic basaltic rocks making it hopeless to attempt magnetic observations. The Southern Cross was fortunate in being able to enter Wood Bay, which was found to run much farther into the land than Ross had supposed, and a landing was made at the base of the grand cone of Mount Melbourne. Some thick reindeer moss was found



Penguins near Cape Crozier.
(From a Photograph supplied by Captain Scott.)

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on shore at this point, indicating that Antarctica is not an absolute blank to the botanist. A broad ice-foot swept southward along the coast from Cape Washington, but the coast itself was easily visible beyond it, as the Southern Cross found the sea much more free from ice than did the Erebus and Terror. On February 9th a landing was made on Franklin Island where magnetic observations were secured on a beach swarming with vociferous penguins. Reindeer moss was discovered here again. Next day the ship lay-to off Cape Crozier waiting for the clouds to disperse and reveal the forms of Mounts Erebus and Terror, which had been hidden from human sight since the ships that brought them their names carried Ross and Crozier back to the open ocean sixty years before. A landing was made near the foot of Cape Crozier at great risk, the party who scrambled on the narrow ledge of rocks being nearly washed away by the surge raised by a mass of ice falling into the sea. When the ship, steering eastward, had passed Cape Crozier a little before midnight the clouds dispersed and Mount Terror stood out plainly, a large part of its upper slopes free from snow and dotted with parasitic cones, each with its crater. At the foot of the mountain near Cape Crozier there stretched the largest penguin rookery yet seen, Mr. Bernacchi estimating the number of birds at millions. But the most impressive feature of all was the great ice-barrier which now began to drag its slow length past the ship, commencing at Cape Crozier and running eastward for an indefinite distance.

As the Southern Cross steamed along the face of the towering wall of ice, much closer than the fear of finding himself on a lee-shore ever allowed Ross to sail, the weather grew bitterly cold. Though it was still summer

402 SIEGE OF THE SOUTH POLE

the temperature fell to -8° F., and the surface of the sea was swathed in a freezing mist. Up aloft in the crow's nest the sun was shining gloriously, and later, when the mist lifted for a moment, there was an impressive glimpse from the deck of the great mass of Mount Erebus, a flag of smoke trailing from the summit. The glimpse was momentary and no photograph could be taken. On February 11th the ship had out-distanced the Erebus and Terror toward the Pole, and the party were farther south than any man had been before, in latitude $78^{\circ} 21' S.$ There was much jubilation on board in consequence. The weather was no party to the joy, and again the little ship had a tempestuous time, tossing about amongst the icebergs off the barrier. As she proceeded the skies smiled once more, and the nature of the great barrier began to change. It grew lower, the edge became indented by irregular inlets and in longitude $164^{\circ} W.$ the wall dipped until it was only a quay of ice inviting the traveller to step ashore. The invitation was accepted, and the Southern Cross moored alongside as if she had been in dock. Here she lay for a whole day waiting for clear weather. February 19th was one of the finest days of the Antarctic year. The ice stretched beyond the reach of the eye in a smooth, uniform, snow-covered sweep over which *ski*-travelling was a joy to men so long cramped up on ship-board. So firm and smooth was it that Mr. Bernacchi declared that it would serve as a road for a motor car. Mr. Borchgrevink and Lieutenant Colbeck made a short sledge trip southward over the ice, attaining $78^{\circ} 50' S.$, and thus establishing a "record" for southward travel. No particulars of this trip have been published.

At 1 p. m. on February 19th the Southern Cross cast off from the barrier and not an hour too soon; the

FIRST ANTARCTIC NIGHT 403

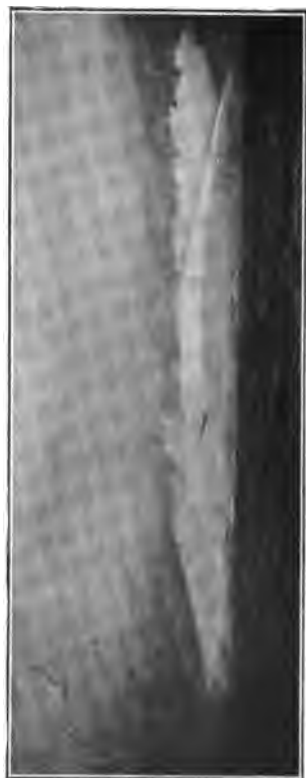
intense cold had already transformed the surface of the sea into a field of young ice through which the powerful engines had as much as they could do to force the ship. Except for a second landing on Franklin Island a straight run was made for the nearest temperate land. No ice whatever was met with, the pack had entirely disappeared, but the weather was extremely boisterous and it was March 21st, 1900, before Auckland Island was reached. In June the scientific staff were home in England.

The scientific results of the expedition were not so great as had been expected. The zoölogical collections had suffered badly in transit, some valuable notes by Mr. Hanson had been lost, and one small volume comprises the discussion of animal life, while the physical observations also fill but little space. Mr. Colbeck's careful and trustworthy map of the great ice barrier showed that its edge had receded about thirty miles since Ross's voyage, and the coast generally was less encumbered by pack ice than it had been sixty years before. Interesting as a dashing piece of pioneer work, and useful in training men for later service, the voyage of the Southern Cross was the last effort of the nineteenth century, the century which had solved all problems of geographical discovery except that of the Poles.

One other expedition of the nineteenth century must be noticed, though, as in that of the Challenger, Antarctic research was only an incident in its work. Professor Chun of Leipzig, a prominent zoölogist, had induced the Imperial German Government to supply funds for a scientific deep-sea expedition under his leadership, which was dispatched on board the Hamburg-America Line's steamer Valdivia, commanded by Captain Krech. No scientific expedition was ever more comfortably installed

404 SIEGE OF THE SOUTH POLE

or more carefully provided for, one detail being that the life of every member of the large scientific staff was insured for £1,500. Of the staff it is only necessary to mention here Professor Vanhöffen of Kiel, one of the zoölogists, and Dr. Gerhard Schott of Hamburg, the oceanographer. The *Valdivia* sailed from Hamburg on August 1st, 1898, and after visiting the Firth of Forth to receive special advice from Sir John Murray, made extensive observations in the Atlantic. She left Cape Town on November 13th, bound for Bouvet Island, which no eye had seen for seventy-five years, and which had been sought in vain by Cook, Ross and Moore. The *Valdivia* steamed slowly westward in the assigned latitude, and although on the morning of November 25th, a sounding showed the depth to be 1,890 fathoms, the multitude of sea-birds made the proximity of land so probable that a very sharp lookout was kept, and at 3 p. m. Captain Krech had the satisfaction of hearing the welcome cry of "Land ahead!" and there seven miles off, rose the sharp outline of the elusive isle. It proved to be a small volcanic island measuring about six miles by five, almost completely sheathed in ice, though it was then close on mid-summer, and the latitude corresponded to that of Belfast. The exact position of the centre was found to be $54^{\circ} 26' S.$ and $3^{\circ} 24' E.$ Ross must have passed eighteen miles north of the island, Moore must have turned back while only about fifteen miles east of it. The photograph taken on board the *Valdivia* and here reproduced, shows this speck of land, a true child of the mists, the first report of which had been hailed as proof of the existence of the mythical Southern Continent. The *Valdivia* pursued her way southward and eastward from $8^{\circ} E.$ to $58^{\circ} E.$, as near the edge of the southern ice-pack as it was possible



Bouvet Island.
(Photograph taken on Board the Valdivia.)

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for a lightly built steel vessel to go, and all along her route, the soundings, taken at frequent intervals, showed an unexpectedly great depth, averaging about 3,000 fathoms. On December 16th the farthest south point was reached in $64^{\circ} 15' S.$ and $54^{\circ} 20' E.$, where the depth was 2,540 fathoms, and Enderby Land should have been only 102 miles to the south. The dredge and trawl came up loaded with stones which had been dropped by the melting icebergs, and when examined these proved to consist of continental rocks, granite, gneiss and schist, with one huge block of red sandstone weighing a quarter of a ton. Enderby Land, if these came thence, was evidently not a volcanic island. More than 180 icebergs were counted in sight at once, the largest ten miles long, the highest rising to 192 feet above sea-level. At that time the crew of the *Belgica* were beginning to work hard in the attempt to escape from a second winter in the ice, and the Southern Cross was lying in Hobart ready to start for Victoria Land. The *Valdivia* proceeded to Kerguelen, where a few days were spent, and then she continued her soundings and dredgings in the Indian Ocean, returning to Europe by the Suez Canal, and reaching Hamburg on April 30th, 1899, after a cruise of the most gratifying success.

CHAPTER XX

EARLY EXPEDITIONS OF THE TWENTIETH CENTURY

“ . . . We ask
To put forth just our strength, our human strength
All starting fairly, all equipped alike,
Gifted alike, all eagle-eyed, true-hearted.”

—ROBERT BROWNING.

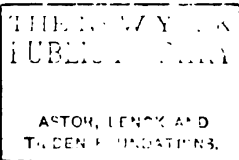
EACH of the recent expeditions has happily its own leader as its chronicler, and their volumes, not this chapter, are required to body forth the latest achievements. We must refer to these great efforts in order to complete our story, showing how the triumphs of the twentieth century have sprung from the thought of the nineteenth, and how far they have extended the knowledge which inspired them. We endeavour accordingly to avoid detail and to supply only a skeleton to be completed by the official narratives of the various expeditions.

Some questions as to the renewal of South Polar research must at present be handled with restraint. When the plans for the various expeditions were being beaten into shape sparks flew about, not perhaps so hot as in the days when the American flotilla was being manned, or as in those when the verbosity of Dalrymple evoked the curt profanity of a free-spoken generation of Sea Lords; yet until these sparks are cold in memory they are best left unstirred.

The action which followed the International Geographical Congress in London in 1895 first took shape in an effort by the Royal Geographical Society, supported by



Sir Clements R. Markham, K.C.B.
(Photograph by Messrs. Thomson, London.)



other learned societies, to induce the British Government to send out a naval expedition, but this was unsuccessful. Sir Clements Markham, as president of the Royal Geographical Society, thereupon reiterated his declaration of two years before that he would never swerve from the task until it was completed. From that time the whole strength of his vehement personality was thrown into the work of promoting an expedition and he triumphed over every obstacle. In face of his enthusiasm others who took a different view as to organisation, or were less hopeful of the practicability of building a ship or dispatching an expedition until all the funds necessary for its completion and return were secured, gradually offered less and less opposition, and finally ceased to urge the views they continued to hold. A remarkable meeting took place in the rooms of the Royal Society on February 26th, 1898, when all the leaders in the movement for polar discovery were present and spoke with a unanimity of purpose which no one who heard them can soon forget. Sir John Murray commenced by summarising the scientific conditions which required investigation, and reiterated his opinion that only a naval expedition with a credit of £150,000 should be looked upon as sufficient for the task of exploration. Sir Joseph Hooker, Dr. Fridtjof Nansen, Dr. von Neumayer, Sir Clements Markham and many others took part in the discussion, which was prolonged to an hour unprecedented in the 250 years' annals of the Royal Society.

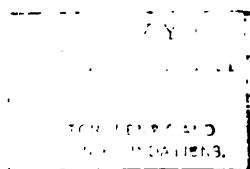
At the same time there was a fresh movement in Germany, where an influential Committee presided over by Dr. von Neumayer selected as the leader of a German Antarctic expedition Dr. Erich von Drygalski, one of the Professors of Geography in the University of Berlin, and

408 SIEGE OF THE SOUTH POLE

already known as a student of Arctic ice in Greenland. Steps were taken to collect funds, and plans were elaborated for an attack on the totally unknown region south of Kerguelen. Through much talk and endless delays the various Committees in both countries made progress slowly. The scheme for a British National Expedition was referred to a joint Committee of the Royal Society and the Royal Geographical Society; but the moving spirit was always Sir Clements Markham. Government was approached and declined to help; even the loan of officers was declared to be impossible in the opinion of those best acquainted with the resources of the navy. The scheme might have dropped once more in England had not two wealthy Fellows of the Royal Geographical Society come forward with magnificent donations, Mr. L. W. Longstaff giving £25,000 (more than double the whole cost of the Belgica expedition) and Sir Alfred Harmsworth giving £5,000. Fortified with this promise of success an influential deputation waited on the First Lord of the Treasury and urged that the Government should participate in the work. In July, 1899, the reply came; it was entirely favourable and a sum of £45,000 was promised in aid of the expedition, and shortly afterwards the Admiralty agreed to allow leave to such officers and men as might be selected from the Royal Navy. Committees and sub-committees continued to meet continually, plans were proposed, rejected and modified, appointments were made and cancelled, differences of opinion arose and were silenced; but at length in 1901 the British and German national expeditions were complete and ready for sea. For each a special vessel had been built, and though the constitutions of the expeditions were radically dissimilar, a basis for co-operation in sim-



Captain R. F. Scott, R.N., C.V.O.
(Photograph by Messrs. Thomson, London.)



ultaneous observations had been arrived at, and in the first year of the twentieth century the two ships passed southward through the Atlantic and entered on their task.

The old name of "Discovery" was given to the new British ship built at Dundee of solid oak. A large area of the hull was kept entirely free from any magnetic metal, so that the most delicate magnetic observations could be made on board. She was barque-rigged with short masts and a small spread of canvas, but had powerful engines for a vessel of her type. The command of the expedition as well as of the ship was given to Commander R. F. Scott, R.N., formerly a torpedo lieutenant, and a man not only born to command but sympathetic with every branch of scientific work. The second in command and navigating officer was Lieutenant Albert Armitage, R.N.R., who had taken part in the Jackson-Harmsworth Arctic expedition in Franz Josef Land and so had seen something of polar ice. The other officers were Lieutenant C. Royds, R.N., who had charge of the meteorological observations in addition to his naval duties, Lieutenant M. Barne, R.N., and Lieutenant E. H. Shackleton, R. N. R. Engineer-Lieutenant Skelton was the official photographer of the expedition. The four warrant officers, seven petty officers and most of the crew of 27 men were picked from a very large number of volunteers from the Navy. In spite of the naval character of the ship's company she sailed under the blue ensign as a yacht. Two surgeons accompanied the expedition, Dr. R. Koettlitz, an enthusiastic naturalist who had served in the same capacity on the Jackson-Harmsworth expedition, and Dr. E. T. Wilson, who was also an extremely talented artist. To each of these special scientific duties were assigned. Three other members completed the scientific

410 SIEGE OF THE SOUTH POLE

staff, Mr. L. Bernacchi, who had been on the Southern Cross expedition and had wintered at Cape Adare, was magnetician and physicist; Mr. T. V. Hodgson, an indefatigable natural history collector, was zoölogist, and Mr. H. T. Ferrar, a young Cambridge graduate, was geologist. Mr. George Murray of the British Museum, who accompanied the expedition as far as Cape Town only, was appointed scientific director. The whole ship's company of fifty composed a splendid body of young men all in the highest state of health and intensely interested in the expedition on which they were bound.

A better set of fellows than the officers and scientific staff were never afloat together, and whatever might have been the case on other expeditions harmony and good-will reigned on board the *Discovery*; each was determined to do his very best and each did it. How much better they might have done with a more thorough preliminary training in scientific work we cannot tell, but as it was the officers and scientific staff of the *Discovery* were able to do more and better work than anyone could have anticipated when they set out.

Leaving Cowes on August 6th, 1901, and Madeira on the 16th, the *Discovery* reached Simon's Bay on October 3rd, and after a short stay sailed for New Zealand on the 14th. In the course of the passage a detour southward was made when south of Australia, in order to carry out some special magnetic work and to give the ship her baptism of ice. The pack was encountered in 62° S., 140° E., and was penetrated for a few miles on November 16th, but there was no time then to spare and the ship headed for New Zealand, calling for a few hours at Macquarie Island, and reaching Lyttelton on November 29th. Certain repairs were necessary and fresh stores had to be

obtained. The people of New Zealand were much interested and very enthusiastic, and when the *Discovery* finally sailed from Port Chalmers on December 24th, 1901, she was laden with welcome gifts in the form of fresh mutton and vegetables.

The main objects of the expedition were officially stated to be to determine as far as possible the nature and extent of that portion of the South Polar lands which the ship would be able to reach, and to conduct a magnetic survey. The question of wintering was left to the discretion of the commander, but a relief ship was arranged for to communicate with the expedition in the following summer.

The *Discovery* met the pack on January 1, 1902, almost on the Antarctic circle, and worked her way through in exactly a week, finding open sea in $70^{\circ} 25' \text{ S.}$, $173^{\circ} 44' \text{ E.}$ A landing was made at Cape Adare on the 9th, and next day the ship commenced her southward progress along the coast, though troubled occasionally by drifting ice. Several landings were made and records set up on shore to guide the relief ship in the following year. On January 22nd, a party landed at the base of Mount Terror near Cape Crozier. The ship then coasted the great barrier eastward, finding soundings of about 300 fathoms, until the 29th, when in 165° E. the water shoaled to 100 fathoms, and for two days' journey farther east it varied between 100 and 70 fathoms, a sure indication of the immediate proximity of land. Land was discovered stretching north-eastward from 155° to 150° W. where a heavy pack made it necessary to turn back. The bare rocks were seen projecting from the snow-covered hills, and in King Edward VII. Land Scott had the good fortune to prove the truth of those signs which Ross had recognised

412 SIEGE OF THE SOUTH POLE

at his farthest east, but could not altogether trust. Returning along the barrier the ship was moored to a low quay of ice in 164° W., where the balloon was landed and a captive ascent made in order to get a wide view toward the south and Mr. Armitage made a sledge-trip across the undulating surface of the barrier to $78^{\circ} 50'$ S.

On February 10th, the Discovery entered McMurdo Bay and anchored a few miles to the south-west of Mount Erebus, in a sheltered harbour where it seemed safe to winter. She sailed over the slopes of the mountains as laid down on Ross's chart, almost the only instance in which that cautious navigator had drawn land from insufficient evidence. Here all possible precautions were taken to secure the ship and to ensure the safety of any land party should the ice suddenly break away and carry the Discovery out. Huts were erected on shore and many short excursions undertaken, in the course of which it was found that Ross's first impression that Mts. Erebus and Terror were on an island was correct, that the Parry Mountains did not exist, and that McMurdo Bay was not a bay at all, but a strait leading southward between "High Island," as Ross first called it, and the mainland, a lofty mountain on which was named after the Discovery. On one of the excursions the only fatal accident during the whole stay in the Antarctic regions occurred, a party being overtaken by a blizzard when crossing a dangerous snowfield terminating in a vertical ice-cliff, over which one of the sailors fell into the sea and was lost.

Early in April, 1902, the cold became very severe, temperatures more than 40 degrees below zero being recorded; but even as late as the first week of May all the ice was blown out of the strait to within 200 yards of the ship. The winter passed cheerily, everyone was busy



The Discovery alongside the Barrier.
(Photograph supplied by Captain Scott.)

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with the observations, with preparations for the sledge journeys in the spring or with the compilation of a brilliant literary and artistic production, the *South Polar Times*. No one before this date had ever wintered so far south by nearly 500 miles, and although the night was long and some cause for anxiety appeared in unmistakable symptoms of scurvy, no one gave way to melancholy, and the disease yielded to treatment.

In spring, early in September, the long sledge journeys began, and they were gradually extended as depots were laid down to the south. Finally with nineteen dogs in good condition and pulling well, Scott, Shackleton and Wilson set out from the ship on November 2nd, 1902, on the main journey over the sea-ice. The winter quarters were in $77^{\circ} 49' \text{ S.}$, 166° E. , and the route lay due south until the parallel of 80° was crossed on November 27th, and then the course was altered for a time to south-west. Depots were laid down at intervals and provisions left to be picked up on the return journey, but going was difficult and progress very slow, for the whole load could not be carried at once and every mile made to the southward entailed three miles of heavy marching. To the west the land rose above the flat surface of the barrier on which the first Antarctic land travellers were toiling along, and when the latitude of $82^{\circ} 17' \text{ S.}$ was reached on December 30th, Scott determined to make an effort to reach the base of the fine mountain range then in sight, but toward the shore the ice became so broken and abrupt that the attempt had to be given up. Mount Markham (15,100 feet) and Mount Longstaff (9,700 feet) are situated in about 83° S. , huge summits which have taken the place so long held by Mounts Erebus and Terror as the most southerly ever seen. It would be impossible to

414 SIEGE OF THE SOUTH POLE

overrate the importance of this splendid journey, and from the modest descriptions of those who made it we have some difficulty in realising its tremendous nature. At the farthest point, after travelling 59 days, the three were 380 miles from their ship, on sea-ice, although in sight of the great range which continues the coast line of Victoria Land to the southward. They had lost or exhausted most of the dogs and the stock of food had been nicely calculated to bring them back to the ship if they never had a full meal all the way and picked up each of the depots left in the trackless waste. The return journey was a heroic achievement. The dogs were useless and the weather very bad. The first depot was approached in a fog, with nothing to guide the travellers, and only two days' provisions were left when it was found. Laden with the supplies left there Scott and Wilson had to pull the sledges alone, for Shackleton had broken down, and only his indomitable will made it possible for him to walk along without burdening his companions further. The ship was reached on February 3rd, 1903, the return journey having been accomplished in only 34 days, as with the lighter loads it was not necessary to do the work by relays. The total absence from the ship had been 93 days, and results of startling novelty as to the nature of the great ice barrier had been secured.

Meanwhile Armitage and Skelton made a journey from the ship up one of the glaciers which descends from the western mountains, nearly in latitude 78° S. They reached the summit of a snow-clad tableland beyond the bare granite peaks of the mountains, and before they were compelled to turn they were 9,000 feet above the sea and 130 miles distant from the winter quarters.

THE TWENTIETH CENTURY 415

Many shorter journeys were made, valuable collections of geological and natural history specimens were secured, and the meteorological and magnetic observations were kept up day and night without intermission. The Discovery had good reason to be content with her first season's work.

Meanwhile at home the Royal Geographical Society, responding to the stimulus of Sir Clements Markham, had bought another ship, a stout Norwegian whaler, the *Morgen*, a name translated into the Morning for her new work. She was placed under the command of Lieutenant Colbeck, R. N. R., whose work on the expedition of the Southern Cross we have already referred to, and sailed from the Thames on 9th July, 1902. Leaving Lyttelton, New Zealand, on December 9th, she crossed the Antarctic circle and discovered a new island (since called Scott Island) on the 180th meridian on Christmas Day. After picking up the records left at various points on the coast, Colbeck sighted the Discovery's masts from afar on January 25th, 1903. The ice had not broken out of McMurdo Strait as in the previous year, and stores had to be sledged across nearly ten miles of frozen sea. The *Morgen* left on her return voyage on March 3rd, a very late date for navigation in such latitudes, but she got through safely. Lieutenant Shackleton was invalided home and Lieutenant Mulock, R. N., of the *Morning* took his place on the Discovery. The ice never broke out and the ship remained fast for another year of steady work and arduous exploration. Great stores of seal-meat and of skua gulls were laid in for food before winter, and the ship's company were thus able to live almost entirely on fresh provisions. The ship was made snug for the winter, greater comfort being secured in

416 SIEGE OF THE SOUTH POLE

consequence of previous experience. A vast addition to the happiness of life was brought about by the use of brilliant acetylene lamps in the living rooms. The winter passed happily and surprisingly quickly, and there was not a single case of illness.

With early spring sledge parties began to go out on excursions of various length, and intensely bitter cold was experienced, vying with any met with by Arctic explorers and rarely exceeded even in northern Siberia. The temperature for days together kept below -50° F. and once fell as low as -68° . After many preliminary trips the main journey was started on October 26th, when Captain Scott led a party including Mr. Skelton and at first Mr. Ferrar. The route lay nearly due west, ascending one of the great though much shrunken glaciers to the vast plateau beyond the mountains. The high altitude and the fatigue told heavily on some of the party, and on November 22nd Skelton started back to the ship with several of the worn-out men, while Scott pushed forward with the two hardiest. Although about 9,000 feet above sea level the flatness of the ice-surface was hardly broken, and the most careful observations with a levelled theodolite could just detect the slight inequalities. There were no dogs on this expedition and so everything had to be hauled by hand on sledges. On November 30th, 1903, Scott reached his farthest point and fixed the position as $77^{\circ} 59'$ S. and $146^{\circ} 33'$ E., a distance of 300 miles from the ship, toward the centre of the continent of Antarctica. The return journey was rapid, and the Discovery was safely reached on Christmas Eve after an absence of 59 days, the average daily journey having thus been about 10 miles, as compared with a daily average of 8 miles on the great southern journey over the



McMurdo Strait.

(From a Photograph taken by the National Antarctic Expedition.)

sea-ice in the previous year. After passing the glacier valley and the mountain border there was nothing to map, nothing to see but snow and sky, no sound of life, no gleam of colour: the visible scene, always bounded by the narrow horizon that a man's height commands, was more uniform than the sea. From the nature of the surface Captain Scott concluded that on this lofty continental plateau the evaporation from the frozen surface equalled if it did not exceed the fall of snow.

Preparations had been made to commence cutting a channel to the ship through the ice from some islets nine miles to seaward, where open water was expected to be found in the middle of December; but at that date the open sea was still separated from the Discovery by seventeen miles of ice, about seven feet thick. The progress of this work by means of sawing and blasting was so slow that it soon became clear that the ship could not be relieved in that way. Everyone however was in exuberant health and high spirits, and when on January 5th, 1904, the Morning appeared at the ice-edge with peremptory orders from home to leave the Discovery and return, the pleasure of receiving news from the living world was changed to gloom at the thought of having to desert the finest polar ship ever built, in perfect condition, and sure of ultimate release. The Morning was accompanied by another and larger vessel, the Terra Nova, sent out by the Admiralty to ensure the relief of a party which happily was in no need of assistance. Hard as it was to do so, steps were taken to obey orders, and by the end of January all the instruments, registers, collections and valuable books had been removed to the relief ships. This was no sooner done than the ice began to break up, and on February 3rd the open sea was only six or seven

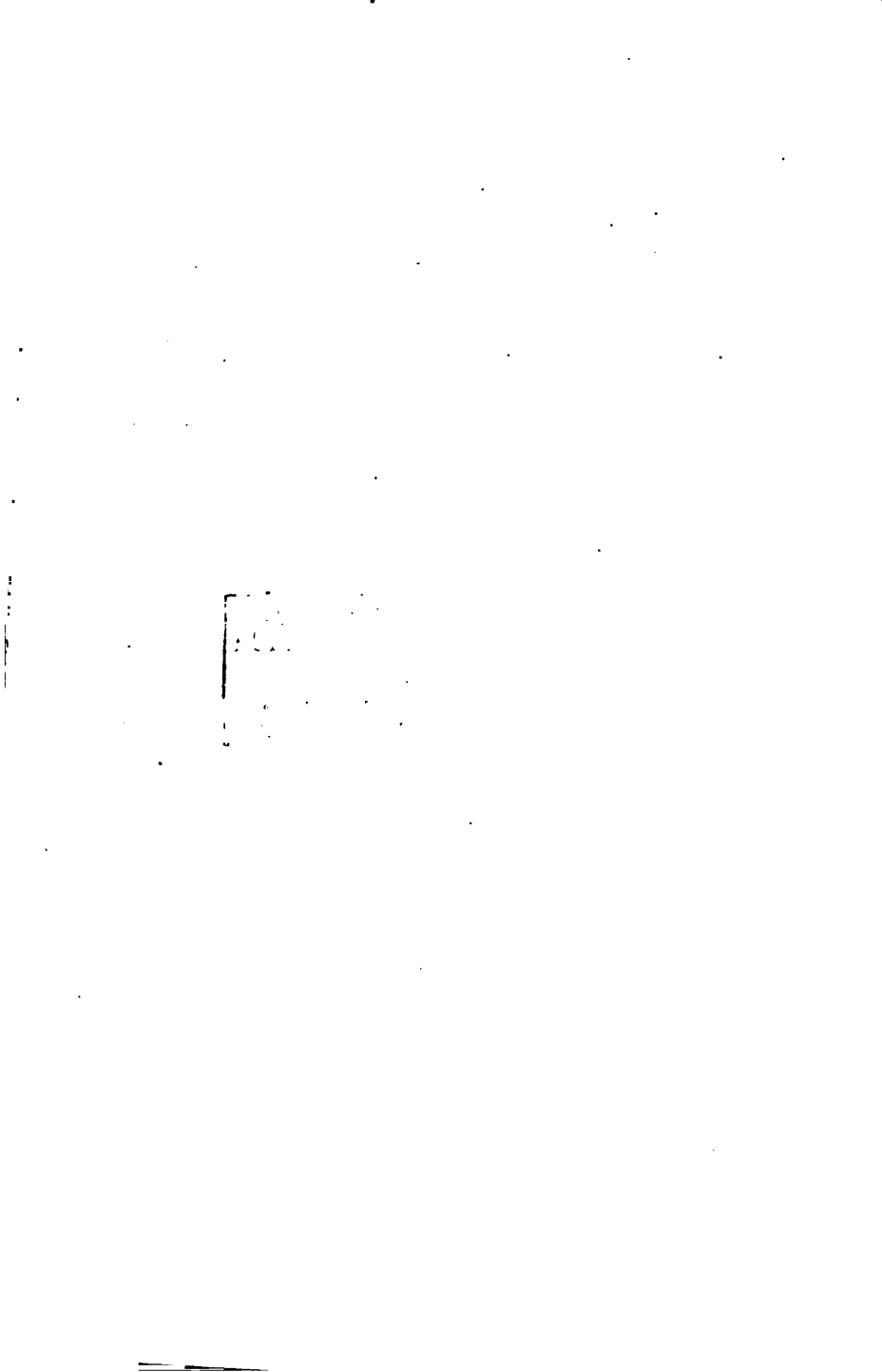
418 SIEGE OF THE SOUTH POLE

miles from the imprisoned Discovery. The crews of all three vessels now set to work making holes in the ice, in which charges of powerful explosives were placed in order to form cracks and enable the ocean swell to do its work more quickly. On the 12th the breadth of the remaining ice was three miles, and on the 14th it broke away so rapidly that the relief ships came close up to the Discovery, which was sealed into a little bay with ice from twelve to seventeen feet thick. On the 16th a final explosion set the ship free, too soon as it happened, for a furious gale drove her ashore and for some time she bumped heavily on a shoal and was in great danger. No real harm was done, and when the storm blew over, the relief ships proceeded to supply coal to the Discovery though the two vessels could spare only 75 tons between them, a ridiculously inadequate amount. On February 18th, 1904, the three ships started northward.

On March 2nd land was sighted, which was thought at first to be Ross's Russell Island, but Scott identified it as Sturge Island of the Balleny group, and clearly recognised the other islands from MacNab's drawing given in the log of the *Eliza Scott*. The opportunity now presented itself of verifying Wilkes's discoveries of land, but the wretched modicum of coal supplied by the relief ships barred a most interesting and quite practicable piece of research. The relief ships had disappeared. Scott made the most of what coal he had, and for two and a half days held on his course westward, well to the south of the Antarctic circle, in clear weather and open sea with icebergs in sight but no appearance of land, and a great ocean swell heaving in from the northward over the positions assigned to Ringgold's Knoll and Eld's Peak. No appearance of Cape Hudson could be dis-



Professor Dr. Erich von Drygalski.
(Photograph by Messrs. Thomson, London.)



cerned when, from its position on the chart, it should have been a conspicuous object.

On March 5th the *Discovery* crossed the Antarctic circle northward, after having spent the unprecedented time of two years and two months within it, and on the 19th she anchored in Laurie Cove, Auckland Island, with only ten tons of coal left in her bunkers. The *Morning* and *Terra Nova* appeared at this rendezvous a few days later, and the fleet proceeded to Lyttleton in company.

The *Discovery* returned to England by Cape Horn and received an enthusiastic welcome on her arrival in September, 1904. The Royal Geographical Society expressed the general feeling of pride and gratification at the outcome of the work by presenting two gold medals to Captain Scott, and steps were immediately taken to have the large collections and series of observations adequately described and discussed. Scott showed that there were grounds for believing the great Southern Barrier to be the edge of an immense field of ice which in some previous period had filled the Antarctic Sea, but was now so far reduced in thickness as to be afloat. The great glaciers descending from the high plateau of Victoria Land were also found to have shrunk greatly.

While the purely geographical achievements of the *Discovery* are things that take the eye and have their value instantly recognised, the more important researches on magnetism, meteorology, oceanography, geology and biology cannot be fully appreciated until they are set in the light of the simultaneous work done by the other national expeditions, and this requires time. Not the least important for purposes of comparison are the results of the German expedition, which were planned to be simul-

420 SIEGE OF THE SOUTH POLE

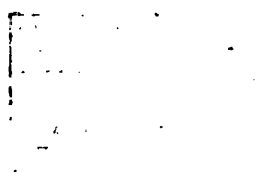
taneous and comparable during the whole of the first year in the ice.

The work of organising the German expedition by Professor von Drygalski was greatly helped by the active participation of Admiral Count Baudissin of the German Admiralty, and by the enlightened action of Count Posadowsky, the Imperial Home Secretary, who secured in April, 1899, a government grant to cover the whole expense. The plans provided for one ship with a supplementary station in Kerguelen Land where a scientific party was to remain during the sojourn of the main body in the ice. The ship was built at Kiel, entirely of timber, was modelled somewhat on the lines of Nansen's famous vessel, the *Fram*, and rigged as a barquentine. She received the appropriate and inspiring name of *Gauss* in memory of the great German mathematician who had done so much to promote the theory of terrestrial magnetism, and indirectly to foster the international rivalry in south polar exploration sixty years before. The scientific staff included as naturalist, Professor Vanhöffen, who had been with Drygalski on his Greenland expedition and also on the *Valdivia*; as surgeon, Dr. Hans Gertz; as geologist, Dr. Emil Philippi, who had spent some time with Sir John Murray in the study of deep-sea deposits; and as magnetician and meteorologist, Dr. Friedrich Bidlingmaier. The captain of the ship was under the instructions of Professor von Drygalski, as leader of the expedition; he was Captain Hans Ruser of the Hamburg-American line, and had accompanied the *Valdivia* as first officer on her short but brilliant cruise. The subordinate officers and crew were carefully chosen, and ultimately there were on board five members of the scientific staff, five officers, and twenty-two men.



The Gauss Under Sail.

(Photograph supplied by Professor E. von Drygalaki.)



Although there were no naval officers or men in the party the Gauss was privileged to sail under the Imperial ensign. She left Kiel on August 11th, 1901, and made a slow voyage to Cape Town, carrying out much valuable oceanographical work on the way. It was not until December 7th that the expedition left the Cape and, calling at Possession Islands in the Crozets, by the way, anchored in Royal Sound, Kerguelen Land, on the 31st. Rabbits, descended from ancestors which came over with the Challenger, came hopping down to the beach to welcome the strangers of whom they had no fear, and the small party of German scientific men which had been landed some months previously by a steamer chartered in Australia were found completing their observatory. The Gauss remained for a month and then, after calling at Heard Island, she steered south-eastward to investigate the region about 90° E., between Knox Land, the most westerly reported with any confidence by Wilkes, and Kemp Land. The parallel of 60° S. was crossed on February 12th, 1902, in 92° E., and icebergs were met with in considerable numbers. On the 14th a sounding was obtained in 1730 fathoms within 60 miles of the position assigned by Wilkes to Termination Land, but a close pack made it necessary to change the course to southwest, and for two days progress was very slow, and no land was seen. On the 19th soundings were suddenly struck in only 132 fathoms and the sea was clear of ice, except large bergs drifting before a strong southeasterly wind.

Early on the morning of February 21st, 1902, land was sighted, entirely covered with ice or snow and situated almost on the Antarctic circle. It lay in the direction of Wilkes's Termination Land, but Drygalski

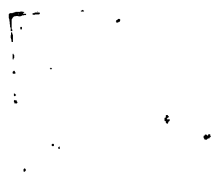
422 SIEGE OF THE SOUTH POLE

seemed doubtful whether it could have been visible from the most westerly point reached by the Vincennes, and gives it no name on his map. A severe storm came on; ice drifted round the Gauss and held her fast; great icebergs came up and ringed her round and it was impossible to get forward or to go back. Preparations had to be made for wintering in the floe. A house was built out of solid blocks of ice to serve as a magnetic observatory; an astronomical observatory was also built, and meteorological instruments set up on the ice. After the middle of March when the position of the ship seemed unlikely to alter, sledging parties were sent out, and one of these travelling southward over the ice reached the land in three days and a half, and discovered a hill rising black and steep above the ice fifty miles from the ship. The height of this hill was estimated at about 1,000 feet, and it was named the Gaussberg. March 29th was a beautiful day, calm and clear. The captive balloon was inflated, and Drygalski ascended to a height exceeding 1,500 feet. He remained aloft for two hours photographing the ice and examining the horizon. The high land to the east was seen to be entirely ice-covered, and to the south the black cone of the Gaussberg stood up from the margin of an ice-clad land which rose behind it to a greater elevation and extended far to east and west. This was named Kaiser Wilhelm II. Land.

Before winter set in a band of emperor penguins appeared, floundering clumsily over the ice to examine the strange creatures who had invaded their domain. Other sledging parties went out and crossed the floe in various directions to the land, just entering the Antarctic region proper which the Gauss, sealed in the floe north of the circle, never penetrated. The winter was passed in dili-



The Gausberg, Kaiser Wilhelm II Land.
(Photograph supplied by Professor E. von Drygalski.)



gent observations of all the phenomena that could be studied. The days were short, but the party were on the sunward side of the circle, and there was no week-long darkness to contend with. The weather however was very bad; tempestuous winds raged for a week at a time, whirling the copious snowfall in fierce blizzards, and often threatening to tear the ship to pieces, though the sea-ice was never cracked or even thrown into dangerous pressure-ridges.

When spring came sledge-journeys were resumed, but they were not for exploration so much as for research, and the results have an importance which cannot be stated at once. No bare land was seen except the solitary nunatak of the Gaussberg, and when summer came all thoughts turned to the freeing of the ship. The ice was from 15 to 20 feet thick, and blasting made no impression on it. A deep trough was melted in the ice to the depth of six feet or more by the heat of the sun beating down upon the black surface of a path of cinders that had been spread from the ship to the edge of the floe for that purpose, and after many days a storm came which first freed the floe and set it adrift, then cracked it along the sun-wrought line of weakness and the Gauss was free.

Burning the oily bodies of penguins as fuel, the ship began to move on February 8th, 1903. For two months she struggled in the ice, trying to work her way to the westward through the drifting bergs and floes, and at length in longitude 80° E. she gave up the attempt and struck northward into the open sea. Oceanographical work was continued and Cape Town was not reached until June 9th. Drygalski was anxious to spend another season in the Antarctic in order to investigate the conditions between the newly discovered Kaiser Wilhelm II.

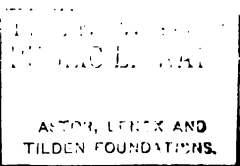
424 SIEGE OF THE SOUTH POLE

Land and Kemp Land; but an appeal to the authorities at home brought in reply definite instructions to return, and the Gauss anchored in the Elbe on November 24th, 1903. The Kerguelen party had suffered severely on account of an outbreak of beri-beri, one of the scientific observers died in the Isle of Desolation, and the life of another was saved with difficulty. But the expeditions had amply fulfilled their primary object of accumulating collections and observations which it will take many years to work out fully.

The first real Antarctic voyage, that of Cook in 1772, included, it will be remembered, both German and Swedish men of science, and the renewal of national Antarctic research a century and a quarter later found the British flag accompanied in those waters by the German and Swedish also. Dr. Otto Nordenskiöld, a nephew of the hero of the North East Passage Baron A. E. Norden-skiöld, planned an expedition in 1899 and succeeded after many disappointments in securing from private donors in Sweden funds sufficient for his enterprise. He had already travelled as a geologist in the south of South America and was anxious to extend his researches to the land projecting from the unknown region toward Cape Horn. He had procured the Antarctic as his ship, the vessel which had been the first after the Erebus and Terror to revisit Victoria Land, and had since been engaged in scientific expeditions to the coast of Greenland. As captain he was fortunate in securing the services of C. A. Larsen who, when commanding the Jason, had twice visited the region for which he was again bound, and the scientific staff consisted of eight specialists, to whom a ninth, Dr. J. Gunnar Andersson, was subsequently added. The expedition left Göteborg on October



Otto Nordenskiöld



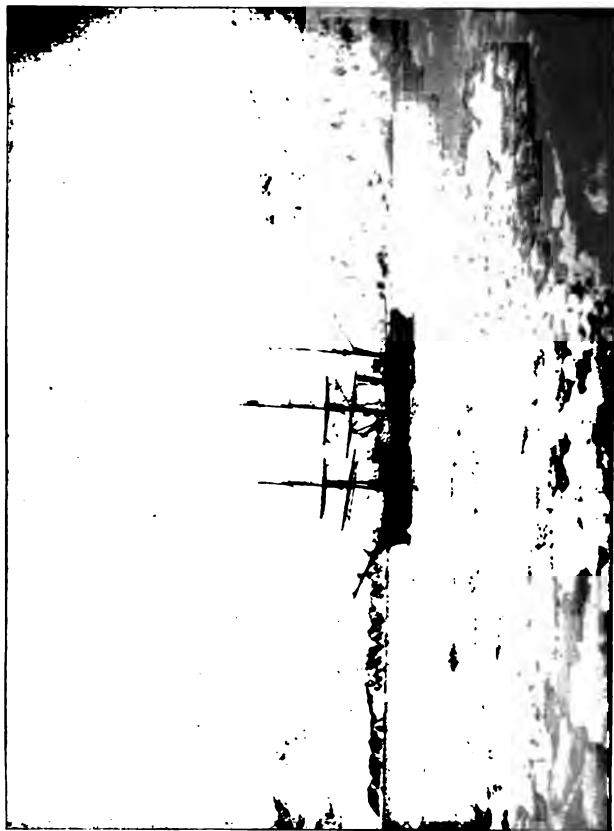
16th, 1901, visited Falmouth and then proceeded to the South Shetlands, calling at Port Stanley in the Falklands and at Staten Island. A young lieutenant in the Argentine navy had joined the party, and the Government of the Argentine Republic had previously undertaken to establish an important magnetic and meteorological observatory near Cape Horn.

The first island of the South Shetland group was sighted on January 10th, 1902, and after running down the west coast of Louis Philippe Land and proving that Orleans Channel did not extend through to Weddell Sea as D'Urville had supposed, but was merely a part of Gerlache Strait, the Antarctic proceeded to Weddell Sea, and tried to get south along the coast of King Oscar II. Land. The ice however was unfavourable, the ship could not get near the coast, nor could she penetrate quite as far as the Antarctic circle. On the way back Nordenskjöld, accompanied by three members of the scientific staff and two sailors, landed on February 12th on Snow Hill Island in $64^{\circ} 25' S.$ with material for establishing a winter house. The ship went north to carry on researches in the open sea and return in the following spring, and the leader saw her no more. The winter of 1902 was spent at this station, and several opportunities for long sledge journeys with dogs were found. The chief journey southward traversed the broad, flat belt of ice attached to the shore of King Oscar II. Land, through which the Seal Islands rise as nunataks. This ice was compared by Nordenskjöld to the great Southern Barrier of Ross, though of course on a small scale, and he was of opinion that it was formed *in situ* by the freezing of sea water and the accumulation of snow. The winter was characterised by terrible weather, a combination of

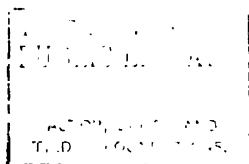
426 SIEGE OF THE SOUTH POLE

great cold and tempestuous wind which for six months practically confined the party to their house, fortunately a comfortable timber structure built in Sweden. Summer returned but not the ship, and a second winter, that of 1903, had to be passed in the ice. When spring drew near in October, 1903, Nordenskjöld started with a sledge party to explore the land to the westward round the base of Mount Haddington. He found that the mountain was situated on an island which he named after Ross, and while pursuing his way along the ice of the channel separating it from Louis Philippe Land, he suddenly encountered two beings from whom the dogs fled howling, and the leader with difficulty recognised them as human. They were black from head to foot, with long black hair hanging down over their shoulders and black bushy beards. They were Dr. J. Gunnar Andersson and Lieutenant Duse, who had left the ship *Antarctic* during the previous summer when it was clear that she could not reach the winter camp, and endeavoured to make their way to it on foot. They had been obliged to build a hut to winter in, and to eke out their scanty provisions with seal blubber which was also their only fuel. The united party returned to Snow Hill and resumed the diligent geological and natural history survey of the locality while waiting anxiously for the ship.

On November 8th, strangers were seen approaching. They proved to be Captain Irizar and one of the officers of the Argentine naval vessel *Uruguay* who had come to offer the party a passage home as no news of the *Antarctic* had been received. That very night, by one of those coincidences so improbable that fiction would hardly dare to copy them from fact, Larsen, the captain of the *Antarctic*, appeared at the camp with five of his



The Antarctic in Cumberland Bay, South Georgia.
(Photograph supplied by Dr. Otto Nordenskjöld.)



men. The ship had been caught in the ice in Erebus and Terror Gulf in January and, after the struggle of a month to get her free, she was found so much damaged that there was nothing for it but to take to the land. The Swedish flag was left flying and the good ship Antarctic, sorely wounded, sank in the waters she had done so much to explore. The crew had wintered on Paulet Island, the third of the isolated parties into which the expedition had been broken up. At last on November 10th, 1903, all were reunited on the Uruguay, and a week later Captain Irizar had the pride and satisfaction of completing in Tierra del Fuego one of the shortest and most brilliantly successful relief expeditions in polar history.

From the day of Cook's Highlander who roused the bergs to echo the skirl of the bagpipes, the bond between Scotland and the Antarctic had been unbroken. The news of the discovery of the South Shetlands was first published in Scotland; Weddell and Ross, although born in London, were of Scottish parentage and influenced by Scottish traditions; Thomson, Murray, Buchanan and several of the officers of the Challenger were Scotsmen, and the Dundee fleet led the way in reopening those seas in 1892. Mr. W. S. Bruce after the return of the *Balæna* took part in the Jackson-Harmsworth Arctic expedition, but he always cherished the hope of returning with a scientific ship to Weddell Sea. In 1898, Mr. Andrew Coats of Paisley, planned a summer expedition to Spitsbergen, and invited a scientific man much interested in polar research to accompany him, but the latter being unable to obtain leave of absence from routine duties was reluctantly obliged to decline, and recommended Mr. Bruce in his place. The friendship thus

428 SIEGE OF THE SOUTH POLE

started bore fruit in the organisation of the Scottish Antarctic expedition, the funds of which were mainly provided by Mr. Coats and his relatives, although the plan and the organisation were due to Mr. Bruce alone. A small Norwegian whaler, the Hekla, was bought, and repaired so extensively as to be practically rebuilt at Troon. She was renamed the Scotia, and was the most graceful and ship-shape of all the vessels which the beginning of the twentieth century sent out toward the South Pole. Bruce secured as captain of the ship Thomas Robertson of Dundee, one of the best ice-navigators alive, and keenly interested in exploration. His scientific staff included Mr. R. C. Mossman, a meteorologist of high reputation, Mr. R. N. Rudmose Brown and Mr. D. W. Wilton as naturalists, and Dr. J. H. H. Pirie as surgeon and geologist. The Scotia left the Clyde on November 2nd, 1902. On January 26th, 1903, she left Port Stanley in the Falklands, and on February 2nd the edge of the pack was met in $60^{\circ} 20' \text{ S.}$ and $43^{\circ} 50' \text{ W.}$ Next day the South Orkneys were sighted and a landing was made on Saddle Island. There was a struggle with the heavy pack, but on February 18th the Scotia slipped across the Antarctic circle in a sea entirely free from pack ice, and she went on until she met the pack and was beset on the 22nd in $70^{\circ} 25' \text{ S.}$, midway between the tracks of Weddell and Ross. Soundings had been made at frequent intervals with a modern deep-sea sounding machine, which can be trusted to give correct results, and at the farthest south the depth was 2,500 fathoms. The sea was freezing and it was necessary to retreat or be held prisoner for the winter, and so the Scotia's head was turned toward the South Orkneys and after a long hunt along the roughly charted coasts a good harbour was



William S. Bruce.
(Photograph by Messrs. Thomson, London.)

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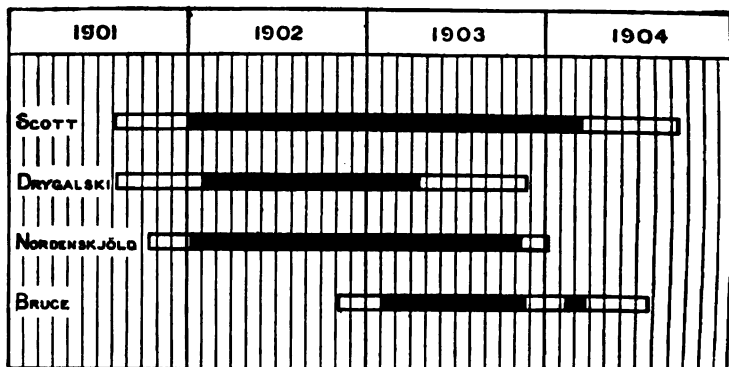
ASTOR, LENOX AND
TILDEN FOUNDATION

found in Laurie Island. There the Scotia dropped anchor on March 26th and four days later Scotia Bay was filled with pack ice and the wintering had begun. A solid stone house was built on shore with walls four feet thick, and a magnetic observatory was also erected, while Mossman got the meteorological instruments installed at once. Scientific work in all departments was soon in full swing and was kept up all the winter, and journeys of considerable extent were carried out on the ice amongst the islands. During the winter the chief engineer died, but all the others retained the most robust health.

On November 27th, 1903, the ship was able to put to sea on her return to the Falklands, but Mossman with five companions remained at the observatory on Laurie Island. The Scotia went on to Buenos Aires where the Argentine Government showed the greatest kindness in various respects, and when she left again on January 21st, 1904, a party of Argentine meteorologists went with her to continue the observations at Scotia Bay for another year. They were landed on February 14th and Mr. Mossman remained with them in charge of the station, whilst the other Scotsmen went back on board and made speed southward. No trouble was caused by the pack, and repeated soundings showed that the ocean had a fairly uniform depth exceeding 2,600 fathoms, until in 72° S., 18° W., the depth was found to be reduced to 1,131 fathoms. On March 6th land was seen, undulating and ice-clad, rising to a great height and fading in the distant sky, and although a close pack made it impossible to approach within two miles of the shore, the sea shoaled to 159 fathoms, a sure indication that it was land indeed. The farthest south attained was 74° 1' S. in 22° W., a position somewhat farther east than Weddell's farthest point.

430 SIEGE OF THE SOUTH POLE

The land was named Coats Land, after Mr. James Coats, Jr., and Major Andrew Coats, the two chief supporters of the expedition. The summer was over, but one piece of work remained and it was accomplished when, on March 23rd, a sounding of 2,660 fathoms was obtained



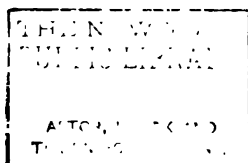
SYNOPTIC DIAGRAM OF THE FIRST ANTARCTIC EXPEDITIONS OF THE TWENTIETH CENTURY.

NOTE—Each vertical column represents a month. The horizontal bands show the duration of the expeditions, the period passed south of 60°S. being shown in solid black.

within a mile of the spot where Ross had marked "4,000 fathoms, no bottom." The powerful undercurrent detected in this locality was reason enough for Ross's error, with his imperfect appliances. The Scotia carried a line of deep soundings across a vast uncharted breadth of ocean from this point to Gough Island and thence to Cape Town where she arrived on May 5th, 1904, and on July 31st she reached the Clyde. Mr. Bruce and his companions had a splendid reception, worthy of the fine record of successful work which they brought home.



The Scotia in the Pack.
(Photograph supplied by the Scottish Antarctic Expedition.)



THE TWENTIETH CENTURY 431

Mr. Mossman remained at Omond House, Scotia Bay, Laurie Island, until February, 1905, when an Argentine vessel brought him back to Buenos Aires after spending two years in unbroken hourly observations in the desolate ice-swept island.

The relation between the various expeditions as regards date and duration may be shown in the form of a synoptic diagram, but it must be remembered that it was only the expedition of the *Discovery* under Scott which wintered south of the Antarctic circle.

The last expedition to which reference has to be made is that equipped by Dr. Jean Charcot in the *Français*, a vessel built at St. Malo in 1903 for the purpose of Arctic exploration. When it became apparent that Norden-skjöld had been obliged to pass a second winter in the far south Charcot resolved to go to his relief and had reached Tierra del Fuego when the Argentine gunboat *Uruguay* returned with the rescued party. His original object having been attained by others, Dr. Charcot resolved to proceed on independent exploration, and so for the second time the French flag entered the seas about the South Shetlands. The *Français* proceeded southward through Gerlache Strait, solved the problem of the Bismarck Strait of Dallmann by proving it to be a bay, sighted Alexander I. Land but could not land upon it on account of the ice, and did an important service in charting the western coast of the islands of Palmer Archipelago. The work occupied the two Antarctic summers of 1903-04 and 1904-05, the intervening winter of 1904 having been spent in the ice. Some anxiety was felt as to the fate of the French expedition when she did not return in February, 1905, and this was increased when the *Uruguay*, after embarking Mr. Mossman at the South Orkneys, visited

432 SIEGE OF THE SOUTH POLE

Wiencke Island in Gerlache Strait and found no news at a place where Dr. Charcot had promised to leave information as to his whereabouts. However the good ship Français, in spite of severe experiences in the ice and of damage which might easily have been fatal, was destined to prove another example of the good fortune which has always smiled on Antarctic exploration and, extricating herself, she entered Puerto Madrin in the Argentine Republic, all well, on March 4th, 1905.

Thus ends the brilliant opening of the twentieth century on the edge of Terra Incognita.

CHAPTER XXI

THE RAISING OF THE SIEGE

"Reculer pour mieux sauter."

THE siege of the South Pole has been a spasmodic operation, proceeding by magnificent efforts separated by long intervals of inertness and inattention. Half a century elapsed before Bellingshausen resumed the attack commenced by Cook, twenty years separated Bellingshausen from the period of D'Urville, Wilkes and Ross, and no less than fifty-four years passed before the task abandoned by the Erebus and Terror was taken up by the Belgica and the expeditions of the new century. As we have seen, the long intervals between the short periods of the great expeditions were partially filled by incidental voyages, each interesting, but affording little real help towards the solution of the problem of exploration. The end of each spasm of endeavour found the edges of Terra Incognita rolled back a little towards the centre, as the series of six small diagrammatic maps shows with all necessary distinctness; but the ground gained by the sudden forward movements was never occupied in a scientific sense, and each fresh expedition had to begin at the beginning, acquiring its own experience too often by repeating the errors of its predecessors. There was no body in any country particularly entrusted with the solution of the problem of the South Pole. The British Admiralty did most, and all its work was well done, but it was merely executive and never took the ini-

434 SIEGE OF THE SOUTH POLE

tiative. The Royal Society responded at intervals to external stimulus, but its action was secondary to that of the British Association in the case of Ross's voyage, and in the Discovery expedition it was a partner with the Royal Geographical Society, which itself had existed for more than sixty years before taking any action to bring about exploration in the Antarctic regions. Though an Enderby, a Newnes, a Longstaff and a Coats did much to make up for the sluggishness and lack of persistence of the learned societies they by no means occupied the place of a Prince Henry giving a life-long devotion to the single cause of specific exploration.

When the Sixth International Geographical Congress laid the foundation of the recent revival of Antarctic research there was some prospect of a new era of steady advance being entered upon through continuous effort under an international arrangement. The condition of things had vastly changed since the time of Cook or even of Ross, both from the intellectual standpoint and in material resources. The Antarctic circle is now only a week's easy steaming from British colonies or Argentine ports presenting all facilities for refitting, and forming convenient sites for permanent bases; the value of continuous observations of climatic conditions is fully understood, and the existence of extraordinary differences in the navigability of polar seas from year to year has been definitely ascertained. The recent expeditions were however all pretty much on the old plan, spending three months in going to their points of attack and three more in coming back; and as each came home it was held as done with, the stores bought at a great price were sold by auction for what they would fetch, the fine ships built or specially equipped at immense cost were disposed of

for a fraction, to be altered and put to any uses to which they could be adapted.

The Antarctic perished honourably in the field of her last achievements. The Gauss was sold to the Canadian Government to be used as an Arctic exploring vessel under the versatile French-Canadian Captain Bernier, so that her destiny is being carried out according to the original design though at the other end of the world. The Terra Nova also remains an exploring ship in the service of a private United States Arctic expedition; the Morning has reverted to her old whaling life; the fate of the Scotia is unknown to us; but the magnificent Discovery, built to her innermost fastenings as a scientific ship, fitted in every detail of her structure for the one purpose for which she was designed, has sunk to mercantile uses which could be as well served by any common sealer. The fickle public has tired of the Antarctic Regions, the learned societies have folded their hands, glad to finish; the explorers, trained and toughened to their work, are scattered in the pursuit of their earlier occupations, and the few men of science who were interested in these matters before the spasm came are still as far as ever from the realisation of a plan for exploration at once economical in men, money, and ships, continuous, thorough, and promising success.

The International Geographical Congress at its meeting in New York in September, 1904, before the dispersal, while there seemed yet time, recorded this resolution:

"The Eighth International Geographical Congress realising that the only untouched fields for geographical discovery are the regions immediately surrounding the poles of the Earth, desires to place on record its sense

436 SIEGE OF THE SOUTH POLE

of the importance of forthwith completing the systematic exploration of the polar areas. *It is very desirable that the experience gained by men of science and officers in the recent Antarctic expeditions should be turned to account by following up without delay the successes they have obtained.* The Congress recognises that the Arctic regions possess a more immediate interest for the people of North America, and expresses the confident hope that the expeditions now being prepared will be so supported as to secure early and complete success."

We have italicised the essential part of the resolution so far as it affects the purpose of this book; but there is no present prospect of the pious opinion being translated into action.

Recognising that there must be a breach of continuity in Antarctic exploration, and confident that it will revive in the future, we venture to suggest some leading principles that might tend to make the next crisis of the exploring fever less intense and more effective.

The first imperative duty is to have the results of the recent expeditions "worked up," a phrase that is perhaps mystifying to the general reader. It means that all observations of latitude, longitude, and altitude are to be calculated out and utilised in the construction of an accurate map. It means in the case of meteorological, magnetic and other physical observations, the checking of original records; the application of all necessary corrections for errors of instruments; the reduction of automatic records to figures; the comparison of these with those obtained by other expeditions contemporaneous or previous, and finally the discussion of the combined data by constructing maps and diagrams so as to reveal the condition of things to be expected throughout the area

in an average year and the variations from time to time. In the case of collections of specimens it means the study and description of all that has been found, so as to compare the region in question, as regards geology and natural history, with other parts of the world. When all this is done it will be more easy than it is now to comprehend the conditions of climate, the movements of sea-currents and the seasonal changes in the ice; and it will be possible to consider how the next advance should be made with the best prospect of success.

It would then be time to form a consultative committee of experienced, and if that be not a contradiction in terms, flexible-minded men, preferably representatives of all the exploring nations, who should plan not an expedition, but a system of research by means of simultaneous and consecutive expeditions and fixed observatories. They would thus attack the problem of the Antarctic once more and keep up the attack until it is solved. That body should be consulted by any wealthy individuals who may be inclined to support some eager would-be explorer, for the enthusiasm of explorers and the money of millionaires are alike only wasted when they are not expended according to a well-reasoned plan. The Consultative International Committee should decide when the funds are sufficient to commence operations, and nothing should be done until the money is ready and in the hands of national executive committees. We say nothing as to how the funds ought to be provided, for that is a matter of finance which may be left to the wealthy individuals who abound, to any alert learned societies not too thickly crusted with tradition, or even to intelligent statesmen who see that the glory of a country does not depend on talk, or trade, or fighting power alone. The

438 SIEGE OF THE SOUTH POLE

responsibility of the scientific authorities lies in the economical and efficient expenditure of any funds that may be placed at their disposal. Perhaps they might consider that three or four vessels of about 500 tons each, built on the whaler model, with engines capable of developing enough power to drive them at ten knots in an emergency, would be a suitable fleet to be employed on the service, and not for one cruise but for successive years. Two vessels might perhaps have their headquarters in Australia or New Zealand, the others in the Falkland Islands or in Magellan Strait, and neither coal nor time should be wasted in taking them back to Europe or North America between cruises.

A suggested plan of operations might be to employ one ship in penetrating to a winter station, retaining one in reserve or working in the open sea at oceanographical research. Two other ships might be used, starting from the neighbourhood of Kaiser Wilhelm II. Land, and from near Alexander Land, respectively, to cruise from east to west round the world in as high a southern latitude as possible, keeping clear of the heavy pack, but pressing on the edge of the unknown whenever it can be done. If one year yields little, a second might give better results in more favourable ice-conditions. This direction of exploration has never been followed for any length of time, although often recommended by the men who have tried to make a similar voyage in the opposite direction. In every case the authorities at home have ordered voyages to be made against the grain of the atmosphere and of the ice-drift. We believe that a vigorous campaign of the kind indicated would cause a rapid shrinkage of the unknown area and reveal new openings for land exploration. It is time at any rate that someone

should revisit the lands discovered by Biscoe, Balleny, D'Urville and Wilkes, to see whether their sheathing of ice has retreated like the edge of Ross's barrier, and to verify their positions.

Wintering parties might well be maintained at the highest attainable latitudes on the Victoria Land and Graham Land sides, while summer excursions seem to be invited on the Great Barrier by means of light motor cars. These should not cost more and would weigh less than balloons and their equipment, the inutility of which was shown by the successful ascents from the Discovery and Gauss. If a motor car ran at the rate of only five miles an hour for a couple of days before it broke down, it would give a sledge party a depot far from their main base and allow of the inspection of a much greater area than could otherwise be examined. Nor is it now too much to hope that continuous communication might be kept up by means of wireless telegraphy.

While it is important to study every kind of natural phenomena minutely, we are inclined to lay more immediate stress on wiping the reproach of *Terra Incognita* from the surface of our little globe. We are not ashamed to say that we would make the effort to reach the pole the chief purpose of exploration, until it is achieved. The pole once attained with difficulty would afterwards be reached with ease, and all needful observations of natural phenomena could be carried out there and on the way thither far better when the crude difficulties of travelling in unknown surroundings have been overcome, and when there is no unscientific hankering after record-breaking to distract attention from serious if monotonous work. We believe that the price of a battleship would conquer all the secrets of the South; not with-

out risk, but still with far less risk than would be met without a thought in a naval engagement, or in say, ten years of football. The argument of risk to life is the most contemptible ever put forward to cover the deep-rooted indifference to the advancement of knowledge underlying most excuses of the kind.

Whenever a reasoned plan of deliberate, systematic exploration is undertaken, as some day it may be, it should be a point of honour, after selecting a competent commander—and such men abound—to tell him in general terms what he is to try to do, and then leave him a free hand as to how he is to do it. When such an explorer returns, his work should be tested before he is either rewarded or blamed, and there should be no more scruple in blaming an explorer who does not do his best than in censuring a naval officer who fails in his duty, while the rewards for success should be at least as generous in the future as they have been in the past.

Our plan for the completion of exploration is simply to substitute systematic for spasmodic methods; to follow up successes and retrieve failures, to make the accomplishment of the end in view more important than a safe return, and above all not to buy a ship or hire a man until the means are provided for carrying out the whole scheme with every material promise of success. The old method has ceased to be satisfactory though it has led to magnificent incidents. The new method may be said to have been already introduced by Mr. Mossman's two years of continuous meteorological and magnetic observations in the South Orkneys which seem likely to be followed up by the most progressive and scientific of Spanish Americans, the people of the Argentine Republic.

Now that the Antarctic ships which inaugurated the

twentieth century so brilliantly are scattered, and the men of science and officers who have linked names with them have turned to other occupations, there is no immediate reason for hurry in resuming the work. It would not be wise in the circumstances to dispatch a new scientific expedition before 1909; unless merely of the nature of a reconnaissance, but the preparations may begin as soon as some original-minded millionaire discovers that money can be put to good use in securing the doing of deeds that would build himself an everlasting name and produce books full of the stir and achievement of a new era of effort and progress greater than any in the past.

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INDEX

- Admiralty Range, 274
- Airy, Sir G. B., Astronomer Royal, 342
- Alexander I. Land discovered, 128
- American enterprise in the Antarctic regions, 92
- American Exploring Expedition, The, 185
- American Sealers, 91, 99
- Antarctic, The, 424, 435
- Antarctic circle, first crossed by Cook, 71
- Antarctic Continent, The, 236, 239
- Antarctic night, 391
- Antarctic problem, The, an element in theological controversy, 11
- Aristotle's theory of the earth's form, 4
- Bache, 179
- Balleny Islands, The, 169
- Balleny and Ross meet, 261
- Balleny, John, 167
- Banks, Mr., (afterwards Sir) Joseph, 67
- Bay of Islands, The, 244
- Belgian Antarctic Exploration, 385
- Bellingshausen, Captain, 100-102, 115, 120
- Biscoe, John, 147
- Borchgrevink, Carstens Egeberg, 380, 384, 395
- Bouvet Island, 69-70, 142, 327, 329
- Bouvet, Lozier, 45
- Bove, Lieutenant, 365
- Bransfield, Edward, 96
- British Association Committee on the question of a South Polar voyage, 189
- British South Polar Expedition, 252
- Brosses, M. Charles de, 50
- Bruce, Mr. William S., 372, 380, 427
- Buffon, 49, 50
- Campbell, Lord George, 358
- Cape Circumcision, 46, 69
- Carpenter's, Dr. Nathaniel, "Geographic," 40
- Carpenter, Dr. W. B., 346
- Challenger, H. M. S., 348
- Charcot, Dr. Jean, 431
- Coates Land, 430
- Colbeck, Lieutenant, 415
- Cook, Captain James, R. N., 54-55, 58
Account of second voyage, 68-69

- Awarded the Copley medal,
 by the Royal Society, 85-
 86
 Hawkesworth's account of
 Cook's first voyage, 63
 Instructions for second
 voyage, 66
 Parentage and early life,
 59-60
 Prepares for his second
 voyage, 64
 Reaches his most southerly
 point, 75
 Return from his second voy-
 age, 84
 The log of his first voyage,
 62
 Cook, Dr. F. A., 387
 Cosmas Indicopleustes, 13
 Cowley, Ambrose, 39-40
 Crozier, Commander Francis,
 252
 Dallman, Captain Eduard,
 362
 Dalrymple, Alexander, 56-57;
 Death of, 86
 Imaginary lands, 79, 81
 Dana, James D., 220
 Diaz, Bartholomew, 19-20
 Discovery, The start of the,
 409
 The fate of the, 435
 The return of the, 419
 Drake, Sir Francis, 32
 Drygalski, Dr. Erich, 407, 420
 D'Urville, Captain Dumont,
 164, 194
 D'Urville, Jules Sebastien
 César Dumont, 194
 Earth's form, Early esti-
 mates, 4
 Enderby Brothers, The firm
 of, 92
 Enderby Brothers, 146
 Erebus and Terror in a gale,
 297
 In collision, 307
 Fanning, Mr. Edmund, 98, 104,
 112
 Fernandez, Juan, 31
 Foster, Captain Henry, 144
 Foxton, J. G., 166
 Franklin, Sir John, 254, 256,
 266, 268-269, 289, 331-332
 Gardiner, Captain Allen, 315
 Gauss, Johann K. F., 181
 Gauss, The, 420, 435
 Gaussberg, The, 422
 Geographical Congress, Sixth
 International, 384
 Geographical Congress at New
 York, The Eighth Inter-
 national, 435
 Geographical Society, The
 Royal, founded, 176
 Georgia, Isle of, 81
 Gerlache, Adrian de, 385
 German Antarctic Expedition
 under Drygalski, 407, 420
 German Society for Polar
 Navigation, 362
 Gerritsz, Dirk, 34-35
 Graham Land, 161
 Graham, Sir James, 161
 Gravelius, Professor, Abstract
 of Russian cruise, 114

- Gray, Captain, 370
- Greely, Lieutenant, 365
- Halley's theory of terrestrial magnetism, 41
- Halley, The first magnetic chart of, 178
- Harmsworth, Sir Alfred, 408
- Hawkesworth's account of Cook's first voyage, 63
- Hawkins, Richard, known as Don Ricardo Aquines, 33
- Henry, Prince, the Navigator, 17
- Herodotus, 3
- Hersilia, The, 98
- Hooker, Dr. Joseph Dalton (afterwards Sir), 254, 269, 294, 315, 320, 384
- Horner, Johann K., 181
- Hudson, Captain, 220, 233
- Humboldt, Alexander von, 340
- Humboldt, Baron, 179, 184
- Idotea Baffini, 278
- India, The sea route to, 20
- Johnson, Captain Robert, 111
- Joinville Land, 318, 319
- Kaiser Wilhelm II. Land, 422
- Kerguelen-Tremarec, Yves Joseph de, 51-54
- Krech, Captain, 403
- Lactantius, 13
- La Pérouse, The expedition of, 194, 195
- Larsen, Captain C. A., 376-377, 424
- Lazareff, Lieutenant, 116
- Leonardo da Vinci, The Globe of, 26
- Longstaff, Mr. L. W., 408
- McCormick, Robert, 253
- Macquaire Island, The, 125
- Macrobius, 14
- Magellan, Ferdinand, 24
- Magnetic Chart, The first, 178
- Magnetic Intensity, The distribution of, 181
- Magnetic Observations, The establishment of, sanctioned, 191
- Magnetic Surveys, Various, 179, 265
- Marco Polo, 15
- Marion-Dufresne, 51
- Markham, Sir Clements, 384, 407
- Maupertuis, 48
- Maury, Matthew Fontaine, 334
- Mendaña, 36
- Meneses, Jorge de, 30
- Moore, Lieutenant T. E. L., in command of the Pagoda, 327
- Morning, The, 415, 435
- Morrell, Benjamin, 104-112
- Mount Erebus, 280-283
- Mount Haddington, 320
- Mount Melbourne, 278
- Mount Sabine, 273
- Mount Terror, 280-281
- Murray, Mr. (afterwards Sir) John, 349, 367, 384

- Nansen, Fridtjof, 376
 Nares, Captain George S., R. N., 349
 Navigator, Prince Henry, the, 17-18
 Neumayer, Professor Georg, 339
 New Caledonia, discovered by Cook, 79
 Newnes, Sir George, 395
 Nordenskjöld, Dr. Otto, 424

 Ommanney, Admiral Sir Erasmus, 367, 384
 Orkneys, The South, discovered, 132-134
 Orontius, The map of, 26

 Pagoda, The, 327
 Palmer, Captain Nathaniel B., 99-103
 Meets Bellingshausen, 100-102
 Palmer's Land, 100-103, 113
 Peter I. Island discovered, 127-128
 Piner's Bay, 236
 Possession Island, 276

 Quiros, Pedro Fernandez de, 36

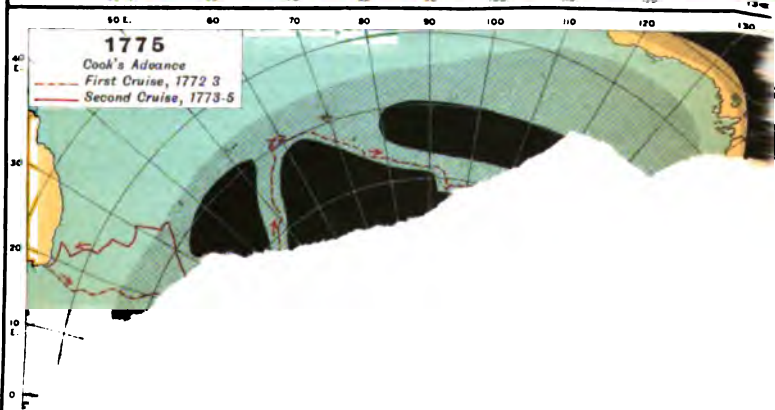
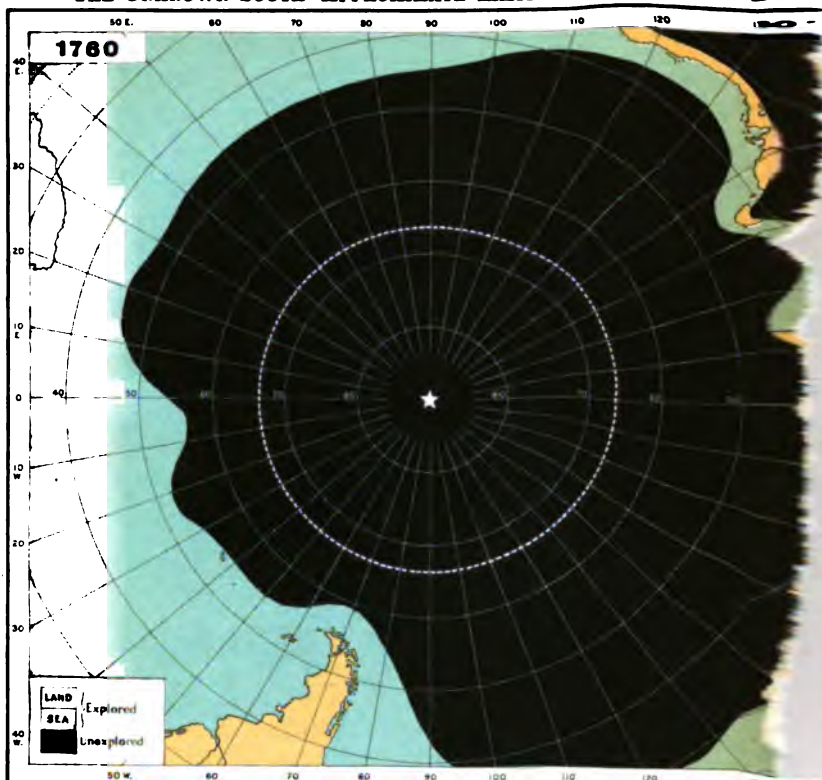
 Rashmanoff, Commodore, 115
 Rea, Henry, 164
 Reynolds, John N., 211
 Ringgold, Lieutenant, 229
 Meets D'Urville and the French Expedition, 243
 Ringgold's Knoll, 228

 Robertson, John, 253
 Roggeveen, 43
 Rosenthal, Herr Albert, 362
 Ross, James Clarke, 180, 182, 246, 249
 Crossed the Antarctic circle, 322
 Discovers Mount Sabine, 273
 First sight of land, 273
 Given the command of the British South Polar Expedition, 252
 Receives the founder's medal of the R. G. S., 289
 Returns to England and knighthood, 325
 Returns to Hobart from his first expedition, 289
 Starts on his second expedition, 291
 Starts on his third expedition, 317
 The Admiralty instructions given to, on starting, 255
 The Royal Society's instructions, 260
 Russians in the Antarctic, 114

 Sabine, Sir Edward, 144, 180
 Sabrina Land, 245
 Sarmiento, Pedro de, 31
 Schoner's Globe, 26
 Scotia, The, 428, 435
 Scott, Captain R. F., R. N., 409
 Scottish Antarctic Expedition, 428
 Shetland, New South, 95
 Smith, Mr. Leigh, 371

- Smith, Captain William, 93
- Solander, Dr., 67
- Southern Barrier, The Great, 280, 284
- Southern Cross, The, 395
- South Georgia, 48
- South Polar Expedition, British, sanctioned, 191
- South Polar Expedition, French, under D'Urville, 193
- South Polar Expedition, The United States, 211
- South Polar Exploration Expedition, Swedish, 424
- South Polar Voyage, British Association Committee on the question of, 188-189
- Sparrman, Andrew, 68
- Stonington, Connecticut, 97, 364
- Terra Nova, The, 417
- Terre 'Adélie, discovered by D'Urville, 202-206
- Thomson, Professor (afterwards Sir) C. Wyville, 349
- Tierra del Fuego, The discovery of, 25
- Torres, 37
- Traversey, Baron de, 114-115
- United States South Polar Expedition, The, 211
- Valdivia, The, 403
- Vasco da Gama, 21
- Vespucci, 21
- Victoria Land, 262, 285
- Walker, Lieutenant, 224
- Washington, Captain, R. N., 185
- Weddell, James, 91, 131
- Wilkes, Lieutenant (afterwards Captain) Charles, 212
 - Receives the Royal Geographical Society's gold medal, 248
 - Tried by court-martial, 248
- Wilkes's Chart, Captain Scott and, 247
- Wilkes's friendly overtures to Ross, 246

THE UNKNOWN SOUTH—APPROXIMATE LIMITS OF UNEXPLORED

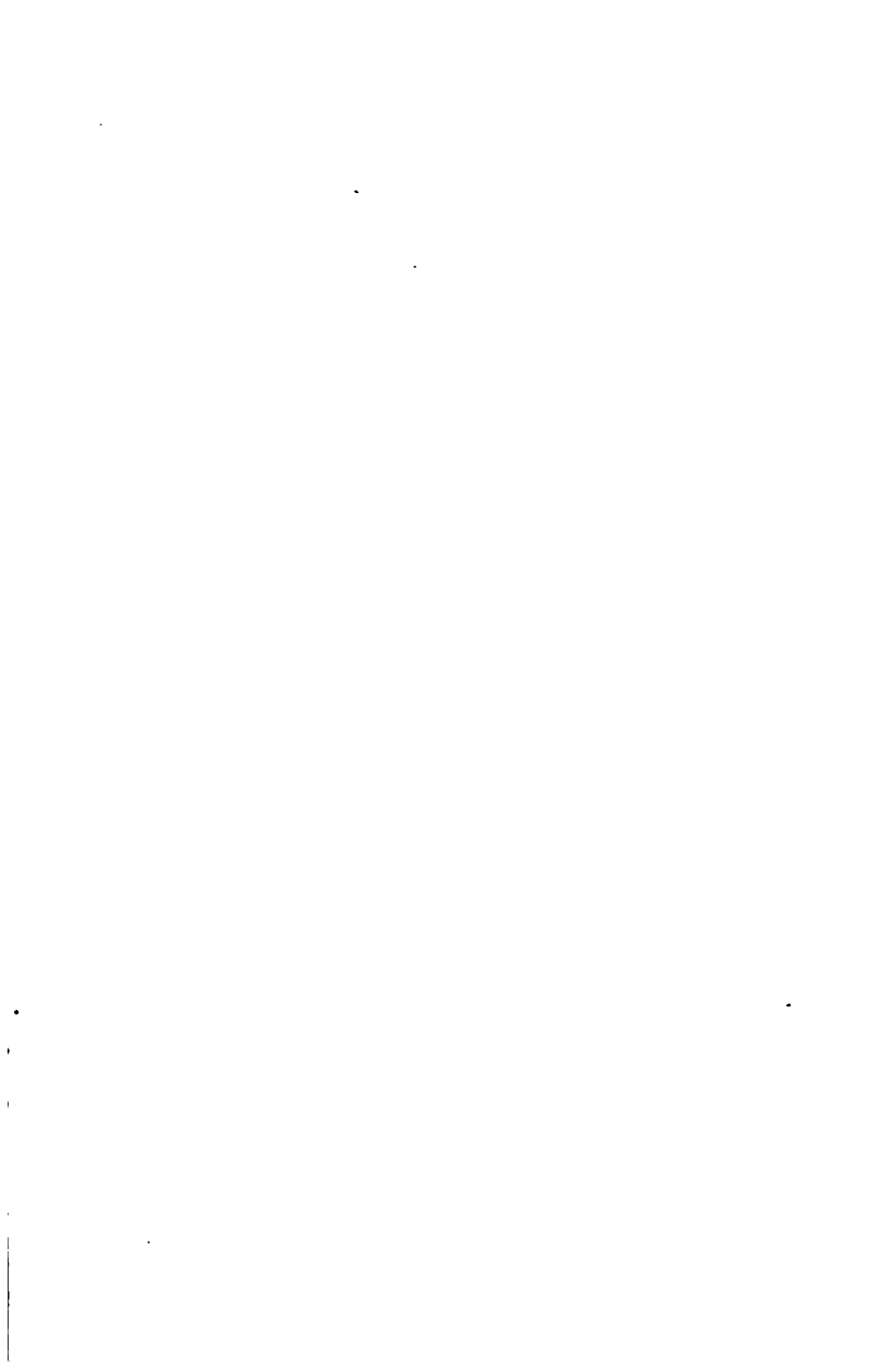


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